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Vol. 89

December 13, 1930

No. 24

In this Issue

The Piped Fuel Bugaboo Page 1258

A detailed analysis, by C. V. Beck, of the relative efficiency of coal, oil and
gas, which shows clearly that gas protagonists are overenthusiastic in their
claims and that coal is the most economical fuel in all important coal-consuming
areas.

Milwaukee Tests Whitcomb Oil-Electric Switchers 1265

High availability and rapid acceleration have proved to be the outstanding char-
acteristics of these locomotives, two of which have been in use for some months
at the Kinzie Street (Chicago) yards of the C., M., St. P. & P.

New Terminal Speeds Fruit Movement From Coast 1268

A description of the Southern Pacific's new yard and modern icing plant at
Fresno, Cal., both of which incorporate interesting features designed to expedite
car movement.

EDITORIALS

"The Country Still Needs Its Railways"	1255
Natural Gas Merely a Bugbear?	1256
Two Electrical Conventions	1257
Two Years of Depression	1257

GENERAL ARTICLES

The Piped Fuel Bugaboo, by C. V. Beck	1258
I. C. C. Urges Regulation of Forwarding Companies	1263
Development Association Meets at Chicago	1264
Milwaukee Tests Whitcomb Oil-Electric Switchers	1265
Fifty-First Annual Meeting of the A. S. M. E.	1267
New Terminal Speeds Fruit Movement From Coast	1268
Motor Transport Hearing Moves to Atlanta, Ga.	1272
Freight Car Loading	1274
Penna. Control of Wabash and L. V. Disapproved	1275
Blow-Off Muffler of Improved Design	1276
I. C. C. Probes Reciprocity in New York Hearing	1277
Mileage Rates Discussed by Chicago Traffic Club	1280
Rivers and Harbors Congress	1281
Curry Grain Door	1282

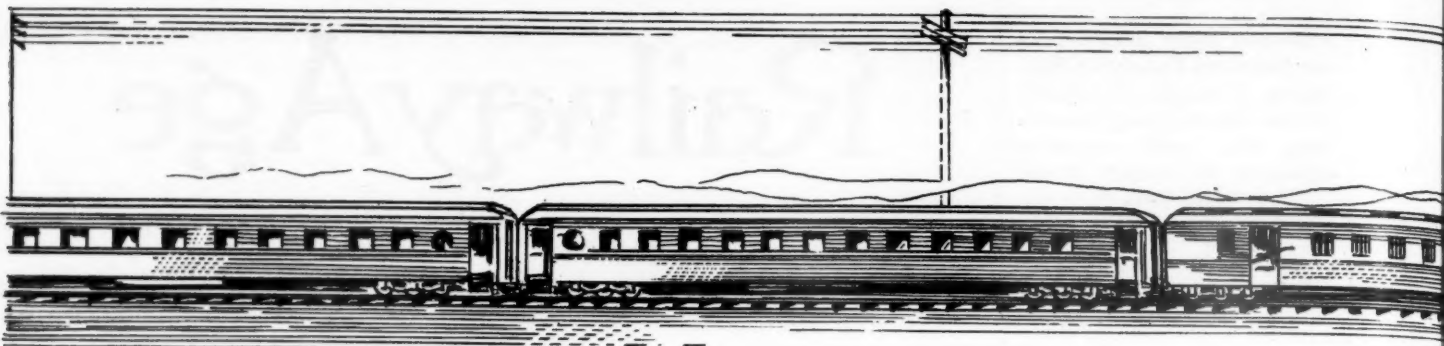
LOOKING BACKWARD 1283

COMMUNICATIONS AND BOOKS 1284

ODDS AND ENDS OF RAILROADING 1286

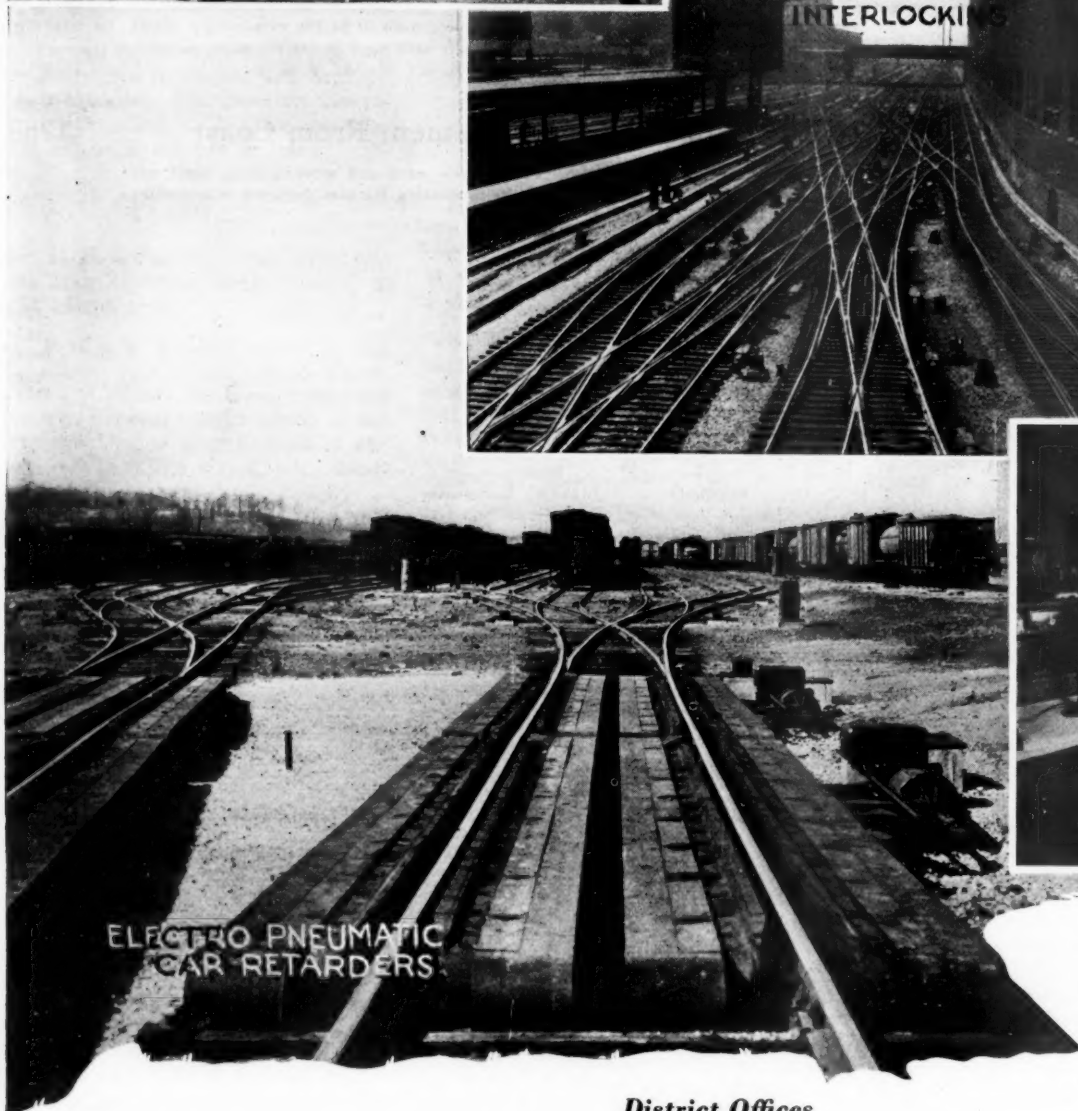
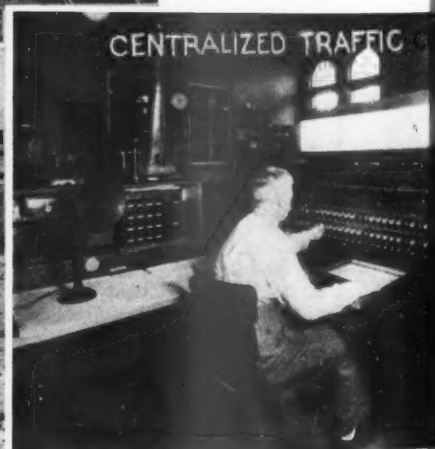
NEWS 1287

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AUTOMATIC SIGNALS

Meeting the

ELECTRO-PNEUMATIC
INTERLOCKINGELECTRO PNEUMATIC
CAR RETARDERS

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Railway Age

Vol. 89, No. 24

December 13, 1930

Table of Contents Appears on
Page 5 of Advertising Section

"The Country Still Needs Its Railways"

"HOWEVER, the country still needs its railways and can support them." The foregoing statement appeared in the annual report of the Interstate Commerce Commission, which was published last week. In a preceding paragraph the commission had shown that in the first eight months of this year net operating income available for interest and dividends had declined \$273,000,000, or nearly 33 per cent. It had added: "If railway finances were suffering only from the fact that a recession in business is being experienced as in other industries of this country and of the world, it might be sufficient to point out that in judging of railway income one should in fairness consider the good and bad years together. But a different and more threatening financial difficulty confronts the railways. This is the effect of the competition of other forms of transportation."

Nobody will question that the commission is right in saying that the country still needs its railroads. As it needs them, it cannot afford not to support them. It is not supporting them now. The earning of a return of 3.51 per cent on property investment, which is the rate at which they earned in the first nine months of the year, is forcing most of them to live largely upon such fat as they have been able to accumulate in earlier years.

The country can actually support the railways only by allowing them to make adequate earnings. Adequate earnings can be derived only from the proper adjustment of rates to traffic. The smaller the traffic the higher must be the rates. The "effect of the competition of other forms of transportation" is to reduce the traffic of the railways. The public is helping to make this competition increasingly effective by subsidizing it and not adequately regulating it. The more traffic other means of transportation take from the railways the higher will be the rates the public will have to pay to support them. The public is responsible for the government policies which are enabling other means of transportation to make such inroads into the traffic of the railways. The public must, therefore, both assume the responsibility and, in the long run, pay the bills if its own policies make necessary higher railway rates.

A Challenge to Traffic Officers

Upon whom rests the responsibility of providing the railways with rates high enough to cause the traffic they

are allowed to handle to support them? That responsibility is divided between the Interstate Commerce Commission and railway officers, especially railway traffic officers.

It has recently been repeatedly charged that the traffic officers of the railways are not doing their duty of getting for the railways high enough rates upon many commodities, and especially upon those owned by big shippers. Among those making the charge have been the Interstate Commerce Commission, former Commissioner Thomas F. Woodlock and F. J. Lisman. The latter two have said that the railways need to create "rate czars." The argument for rate czars is that the traffic officers of individual railways will not deal in good faith with each other, that they fear big shippers will make reprisals by diverting traffic from railways the officers of which oppose reductions or propose advances in their rates, and that, in consequence, high enough rates can be secured only by groups of railways or the railways as a whole employing traffic men who do not represent any individual railway.

Traffic officers admit their fear of each other and of reprisals by big shippers. Most of them, however, oppose the proposed creation of "rate czars." In these circumstances it is reasonable and inevitable that the traffic officers should be asked to confer and propose their own solution of the problem presented. It is the especial function of the traffic officers to get adequate revenues for the railways. Whatever may be the reasons, they have not been successful in doing so. This is proved by the fact that the railways have not been getting adequate revenues. As it is the function and duty of the traffic officers to get adequate revenues, and as they have not been doing so, they cannot consistently reject suggestions made by others for accomplishing this purpose, and at the same time refrain themselves from offering definite suggestions of their own for accomplishing it.

One of the greatest problems confronting the railways is that of destroying the power of the big shipper, which causes "voluntary" reductions of so many rates that ought not to be reduced, and prevents advances of so many rates that ought to be advanced. The Interstate Commerce Commission repeatedly has "passed the buck" to the railways in regard to rate making by intimating that one important reason why railway earnings are in-

adequate is that competitive practices of the railways themselves result in making and keeping many rates too low. The Interstate Commerce Commission must be deprived of the opportunity to thus "pass the buck." Will the traffic officers themselves devise means of doing this, or will they wait until some method of accomplishing it is forced upon them?

Policy of the Commission

And when will the Interstate Commerce Commission itself begin to regulate rates in accordance with its statement that "the country still needs its railways and can support them?" Year after year, while the railways have not been earning a fair return, the commission has been reducing rates and refusing to sanction advances proposed by the carriers. In very few instances have its decisions been based upon what the traffic will bear. Sometimes reductions have been made to remove discriminations; but discriminations can be removed as easily by advancing one rate as by reducing some related rate. Sometimes large reductions have been ordered, as in the deciduous fruit and the grain rate cases, to aid some industry that was supposed to be in distress, although through no fault of the railways. A reasonable system of rates is one which, in the aggregate, will yield the railways a fair return, and the various rates composing which are fair as compared with each other. When the railways themselves are not earning a fair return there can be no justification in law or economics for reducing their earnings to help other industries, unless the earnings of all industries not in distress are also to be reduced to help those that are in distress.

However, it is encouraging to have the commission expressly recognize the fact that "the country still needs its railways and can support them." That can mean nothing other than that the traffic available for and moving upon the railways can and should be made to bear high enough rates to enable the railways to make adequate earnings. The railways should take the commission at its word, and adopt such action as will put upon the commission the full responsibility for any future failure of the railways to make adequate earnings.

We believe the railways will do that. We believe that the time has passed when the railways and their employees will submit without a fight to such regulation of rates and subsidizing of competing means of transportation as have prevailed in the past. We hope the time will soon come when the traffic officers of the railways will get together and adopt measures which will destroy fear of the big shipper. The railways recently have been drifting toward disaster. The disaster can be averted. "The country still needs its railways and can support them," and the railways can obtain and maintain a reasonable measure of prosperity if they, their employees and other industries affiliated with them in interest will promptly begin to do the things that need to be done to change present and prospective conditions.

Natural Gas Merely a Bugbear?

JUST as a few years ago a preliminary funeral was held for railroad coal traffic by speakers and writers on electric "super power" or "giant power," so in recent months have protagonists for natural gas gained wide currency for the belief that they are rushing forward to "relieve" the railroads of the bulk of their present coal tonnage.

There is no doubt about the extension of natural gas pipe lines and that a considerable increase in the use of this fuel may be expected. But is this increase to continue indefinitely until the coal industry is still further depressed? Some natural gas enthusiasts would answer in the affirmative, but on another page of this issue we publish an article by C. V. Beck, an engineer and a student of fuel economics, who presents a somewhat different, and more hopeful, picture. In this article, heating efficiency of various fuels, in relation to comparative costs, is given with the inevitable conclusion that natural gas cannot be piped far, and must be sold cheaply indeed, if it is to compete in great measure with coal in most of our important coal-consuming areas. It is pointed out that natural gas at 40 cents per 1,000 cu. ft. for industrial use is equivalent to coal at \$11 a ton—and what industry has to pay such a price for its fuel? Screenings coal sells in the greater part of the industrial area of the country at not more than \$3.50 a ton, which is equivalent to natural gas at 12.6 cents per 1,000 cu. ft.—and where is it available at that price?

Natural gas has certain advantages of convenience for domestic use, to some degree counteracted by the recent perfection of automatic firing devices for domestic furnaces. It can, however, make no claim to economy, except where consumers are located near the wells and coal is far away. Natural gas at the relatively moderate domestic price of 72 cents per 1,000 cu. ft., according to Mr. Beck's calculations, is equivalent in heating value to bituminous coal at \$20 a ton, a fantastic price in most localities.

Most of the railroads are definitely concerned in the future of the coal trade and railroad men can well afford to acquaint themselves with its problems. The workings of the laws of economics are inexorable and eventually the various fuels will find their natural relative places in the economic scale. Unfortunately, however, the working of economic laws can be considerably delayed by skillful ballyhoo, and much waste may result as a consequence.

The wise course, when questions such as this arise, is to examine the economics involved before definite commitments are made. Once a pipe line is laid, or a contract for gas fuel is signed, the time has passed when a full statement of the merits of coal can assure careful consideration of them. Mr. Beck writes frankly as an advocate—but with all the attention the gas protagonists have secured, some enthusiasm on behalf of coal is certainly not amiss. Coal needs defenders and most of the railroads have only slightly less interest in seeing that

it has them than has the coal industry itself. Mr. Beck's article indicates the fundamentals, at least, of the kind of defense which those in interest may make in behalf of this fuel.

Two Electrical Conventions

TWO electrical conventions were held in Chicago during the last two weeks in October, namely, that of the Association of Railway Electrical Engineers and that of the Electrical Section, Division IV—Engineering, American Railway Association. Together these two bodies now cover admirably the association requirements of electrical men in railroad service. There is no duplication of activity except for the general subject of illumination and in this case one report is presented to both organizations.

Consolidation seems to be the order of the day and to many it appears that two associations should not be necessary. One suggestion offered is that the A. R. E. E. should become a section of Mechanical Division V, A. R. A. This would result in a distinct and undesirable line of cleavage between the electrical work in the mechanical and engineering departments. Coordination is necessary to the establishment of standards and to avoid duplication of railroad organization.

Another suggestion is that the A. R. E. E. members drop their organization and join the Electrical Section. This would put all electrical matters, in so far as association work is concerned, into the hands of an engineering organization; a move which would probably not meet with the approval of mechanical department heads. To have the Electrical Section become a part of the A. R. E. E. would present similar difficulties.

One solution suggested is to have an Electrical Division of the A. R. A., with engineering and mechanical sections; this group to serve the needs of Engineering Division IV and Mechanical Division V, and to coordinate the electrical requirements of the two departments. With this arrangement there would be but one electrical convention with separate meetings for the consideration of engineering and mechanical department matters, and joint meetings for subjects of common interest. This suggestion has much to recommend it, but seems somewhat idealistic in view of existing association organizations. Another objection is that it might take too many electrical men away from the railroads at one time.

The essential difference between the two associations as they now function is not that one interests itself in engineering department affairs and the other in mechanical department matters. The Electrical Section is for the most part made up of the ranking men in the electrical departments and interests itself largely in matters of policy and in the broader practices of electrical engineering as applied to railroad service; this includes heavy electric traction. The A.R.E.E. provides

a flexible medium for the interchange of ideas among those electrical men who are responsible for the operation and maintenance of equipment used on cars and locomotives and in the shops and yards, which are essential to the daily operation of a railroad. Both groups perform important functions and it would appear that no consolidation should be effected which would impair the service to railroads which is rendered by each.

Two Years of Depression

COMPARISONS between 1921 and 1930 are interesting because, measured by the return earned upon property investment, they are the worst years that the railways have had since they suffered the effects of the panic of 1893. The decline of traffic in 1921 was greater than it has been in 1930. In 1921, however, the railways handled 15 per cent more passenger business and 23 per cent more freight business than in 1911, a decade before. The difference between the rates of growth of traffic in the decade immediately preceding 1921 and in the decade immediately preceding 1930 is strikingly illustrated by the fact that this year the railways are handling about 40 per cent less passenger business and about three per cent less freight business than in 1920, ten years ago.

The passenger business of the railways in 1921 was much larger and their freight business was smaller than they have been in 1930. In the first ten months of 1921, however, their total earnings were about \$116,000,000 more than in the first ten months of 1930. The principal reasons for this are that since 1921 average revenue per passenger per mile has declined 12 per cent, and average revenue per ton-mile has been reduced 16 per cent.

In the first ten months of this year taxes were \$73,000,000, or 31 per cent greater than in the first ten months of 1921. This reduction in total earnings and relatively large increase in taxes have been accompanied by a reduction of over \$505,000,000 in operating expenses. In consequence, with a reduction in operating expenses so greatly exceeding the reduction in total earnings and increase in taxes, the railways in the first ten months of the year earned \$273,000,000 more net operating income than in the first ten months of 1921. At the beginning of 1921, however, their investment in property was only about \$20,500,000,000, while at the beginning of 1930 it was \$25,870,000,000, an increase of about \$5,370,000,000 on which to earn a return. The return earned in the entire year 1921 was 2.87 per cent, while in the first ten months of 1930 it was at the annual rate of 3.51 per cent; but for the entire year it will be less than this.

About the only good thing that can be said for the year 1930 is that it will not be as bad for the railways as was 1921.

The Piped Fuel Bugaboo

*Gas protagonists overenthusiastic—Coal most economical
fuel in all important coal-consuming areas*

By C. V. Beck

President, St. Louis Coal Co., and
General Sales Mgr., Lumaghi Coal Co.

FOR more than a year, the country has been deluged with propaganda, much of it misleading, in regard to the supposed advantages of piped fuels. Piped fuels lend themselves to the full sweep of the imagination. The most extravagant claims made for oil or gas appear very plausible. Moreover statistics of the growth of output of these fuels are so impressive, alongside of a stationary production of coal, that it is easy to create the idea that all users of heat are eager for piped fuels. The very unit of measurement of natural gas, the cubic foot, lends itself to creating bewilderment in a maze of figures of astronomical proportions. The 1929 output of natural gas was 1,917,451,000,000 cu. ft. However as one cubic foot of gas is roughly equivalent in heat content to one ounce of coal, it may be well to note that the 1929 coal production, in similar terms, was 19,487,744,000,000 ounces.

The failure of coal production to show normal growth over the past decade is rather the result of the rapidly improving efficiency of combustion than the increased consumption of competitive fuels. In 1919, 3.2 lb. of coal were consumed per kilowatt hour of electric production. In 1929, only 1.69 lb. of coal were used, a decrease of almost one-half. There is no reasonable probability that heat-power efficiency in the future can continue to improve at a rate sufficient to prevent increased coal demand commensurate with growing power and heat requirements.

Importance of Coal Traffic to Railroads

Coal production in 1929 totaled 609,000,000 short tons; 5.7 percent greater than in 1928 and considerably above the average of the period since 1921. Approximately 5,000,000 tons were used as colliery fuel and 22,000,000 tons were sold for wagon load delivery from the mines. Thus 582,000,000 tons remained available for rail shipment. The railroads, themselves, consumed 115,000,000 tons. 460,000,000 tons of revenue coal and coke originated on American railways last year.* This represents 34 percent of total freight traffic and \$1,030,000,000 freight revenue, 21 percent of freight receipts, was derived therefrom. Railway executives are naturally concerned about any development jeopardizing the future of this traffic, which is by far the most important single commodity group.

The National Coal Association recently estimated that if all the natural gas lines now projected are completed and run to full capacity and did nothing but displace coal, the loss would involve only 17,000,000 tons per annum. This same organization estimates that natural gas equivalent in heating value to only 20,000,000 tons of

coal is competitive at the present time with the latter fuel. (See table II.)

The great increase in natural gas and fuel oil consumption has occurred in the Southwest and in California. This is a logical development. There are great quantities of oil and gas in California but it is remote from any important coal field. A considerable part of the coal burned there has, for years, been imported from Australia and Asia. A somewhat similar situation prevails throughout the entire Southwest. The coal fields are small and the costs high. Only 70 per cent of the natural gas output is used in the great gas producing states of California, Oklahoma, Texas, Louisiana, and Kansas. Ninety per cent of the coal tonnage originates east of the Mississippi river. This is the area of greatest industrial development and densest population. Here coal is very cheap. Mining costs are low due to thick seams. There are enormous deposits of cheaply mineable coal of good quality. The coal fields are scattered so that the rail haul to industrial centers is short; the traffic is dense and freight rates are very low. This situation is diametrically opposite to that prevailing in the territory where oil and gas have made their great increases.

Artificial Gas Cheap in East

There is a great deal of misunderstanding respecting the comparative importance of various fuels and therefore basic data on this subject are set forth in Table II.

East of the Mississippi river another very different situation exists in regard to natural gas. Gas coal is very cheap. There are innumerable by-product coke plants dotting this part of the country. The coke and by-products other than gas carry the entire cost and must be produced regardless of the demand for gas. The by-product gas may be considered as costing nothing. Indeed a much larger quantity of by-product gas is available at many of these plants than they are now able to sell. This "free" gas is produced in the place where it is consumed. Natural gas cannot improve on such a situation. Artificial gas is cheaper to produce per equivalent heat content in the Eastern and Central parts of this country than the cost of transporting natural gas to that same territory.

The natural gas line from Louisiana to St. Louis is perhaps the first large industrial trunk line to be completed to a heavy coal consuming territory. This gas is being sold for industrial uses only. The local gas company in St. Louis does not distribute natural gas at retail, probably due to the reasons stated. The gas pipe line to St. Louis is evidently a severe disappointment to its sponsors; never having run at even as high as 50 per cent capacity to date, although in operation for an entire year. A small amount of the gas has been sold

* Including railway fuel originating on "foreign lines" and on which freight charges are paid.

for some special uses, displacing a little coal and a considerable amount of fuel oil. Much of the gas is being distributed on short trial runs at low prices, far below the original estimated realization necessary for profitable operation. When the natural gas line into St. Louis tried to supercede coal, it was proven impossible on a basis profitable to gas.

Assume Fantastic Prices for Coal

Writers on natural gas seem to have become intoxicated with the wine of their own enthusiasm and have made many absurd comparisons. It is suggested that natural gas will be a boon to large industries on the basis of 40c per M. which is equivalent to \$11 per ton for an average quality coal. One writer has dwelt on how cheap natural gas would be to the domestic consumer even at the rate of \$2.25 per M., stressing the fact that 1,000 cu. ft. contained a whole million heat units. A ton of very ordinary coal contains twenty-five million heat units and \$2.25 per M. for natural gas is equivalent to \$62 per ton for ordinary soft coal. A recent natural gas article estimated a probable cost for an ordinary family for all heating purposes at \$59 per year for 50 M. of gas. This is \$1.18 per M. and deducting an ordinary cooking load of 3M. per month, it leaves the heat equivalent of one-half ton of coal for the winter heating!

It is a well-known fact that industrial sales of natural gas are being solicited on long time contracts at reasonable distances from the wells on an average of 25 cents per M. and domestic rates in the so-called natural gas cities average around 70 cents per M. Nevertheless, there have been advertisements attempting to show the low cost of natural gas in which 10 cent gas was compared with \$3.50 per ton coal and 57 cent domestic gas was compared with what would amount to \$32 per ton for domestic coal. Where does coal sell at such a price?

In a recently published brochure issued in the interests of the natural gas industry, it is stated "In some cases industries owe their very existence wholly or in good part to natural gas—die casting, for example, was practically unknown prior to the introduction of natural gas as an industrial fuel." The entire history of the invention of die casting machinery and the development of the industry is associated with the vicinity of New York, where natural gas is not used. While die-castings are now produced in many cities and hence both natural and artificial gas are variously used in this work, by far the greater part of the total output comes from cities using artificial gas. However, it should be noted that the wording of the statement quoted is not entirely clear as to whether it means that the use of natural gas was an indispensable adjunct to the invention and development of the die casting industry or whether it merely infers that this occurred in a later year than that in which natural gas was first used as an industrial fuel.

There is only one industry in which natural gas is virtually indispensable. Natural gas burned under the proper conditions produces carbon black soot most economically and prolifically.

Heat Units Move Cheaper by

Rail Than by Pipe Line

The heat values of coal, oil and gas are expressed in the unit of heat known as a B. T. U. One B. T. U., or British thermal unit, is the amount of heat required to raise one pound of pure water one Fahrenheit degree. Coal produced east of the Mississippi River has a B. T. U. content ranging from 14,500 B. T. U. per pound to as low as 10,000 B. T. U. per pound (as received). The

United States Bureau of Mines estimates the average quality of bituminous coal contains 13,100 B. T. U. per pound or 26,200,000 B. T. U. per ton. For sake of conservatism all calculations herein are based on coal with a heat content of only 12,500 B. T. U. per pound or 25,000,000 B. T. U. per ton. On this basis the relative value of oil and natural gas, compared with coal, is set forth in Table I.

Natural gas transportation costs are so highly variable in different pipe lines that it is difficult to strike a sound average. Floyd W. Parsons, editor of "The Gas Age Record" recently said that it costs from 3 cents to 4 cents per 100 miles per M.† to transport gas. Standard Statistics states such costs range between 3½ cents and 17½ cents. Costs as low as 2.2 cents per 100 miles per M are estimated for projected pipe lines attaining maximum efficiency. These transmission costs are based on actual cost of pipe line construction and not on capitalization thereof. Moreover they assume continuous operation at full capacity. It, therefore, appears that an assumed cost of 2½ cents per 100 miles per M

† Pipe line costs per M refer to gas at normal temperature and pressure.

TABLE I
Table of Comparative Fuel Values

Coal—Average Grade	
B.t.u. per pound (as received)	12,500.
B.t.u. in a ton (2,000 lbs.)	25,000,000.
Oil	
B.t.u. per pound	18,000.
B.t.u. in a gal. (av. wt. oil 6.944 lb. to gal.)	125,000.
Gallons required to equal 1 ton of coal	200.
B.t.u. in a barrel (42 gallons)	5,250,000.
Barrels required to equal 1 ton of coal	4.762
Natural Gas	
B.t.u. per cubic foot	900.*
B.t.u. per 1000 cubic feet (Per M)	900,000.
Cu. ft. required to equal 1 ton of coal	27,777.
Artificial Gas	
B.t.u. per cubic foot	550.
B.t.u. per 1000 cubic feet (per M)	550,000.
Cu. ft. required to equal 1 ton of coal	45,454.

* Natural gas is usually quoted as having 1000 B.t.u. per cu. ft. All that can be obtained with perfect combustion, due to fuel loss in forming water (H₂O), is 875 B.t.u. average.

Coal at the following prices Per Ton	Price		Oil or Gas would have to sell for to equal above quality coal	
	Per Gal.	Per Bbl.	Natural Gas per 1000 (M)	Artificial
\$1.00	.005	\$2.10	.036	.022
1.25	.006	.264	.045	.027
1.50	.007	.315	.054	.033
1.75	.008	.369	.063	.038
2.00	.010	.420	.072	.044
2.25	.011	.474	.081	.049
2.50	.012	.525	.090	.055
2.75	.013	.579	.099	.060
3.00	.015	.630	.108	.066
3.25	.016	.684	.117	.071
3.50	.017	.735	.126	.077
3.75	.018	.789	.135	.082
4.00	.020	.840	.144	.088
4.25	.021	.894	.153	.093
4.50	.022	.945	.162	.099
4.75	.023	.999	.171	.104
5.00	.025	1.050	.180	.110
5.50	.027	1.155	.198	.121
6.00	.030	1.260	.216	.132
6.50	.032	1.365	.234	.143
7.00	.035	1.470	.252	.154
7.50	.037	1.575	.270	.165
8.00	.040	1.680	.288	.176
8.50	.042	1.785	.306	.187
9.00	.045	1.890	.324	.198
9.50	.047	1.995	.342	.209
10.00	.050	2.100	.360	.220
10.50	.052	2.205	.378	.231
11.00	.055	2.310	.396	.242
11.50	.057	2.415	.414	.253
12.00	.060	2.520	.432	.264
12.50	.062	2.625	.450	.275
13.00	.065	2.730	.468	.286
13.50	.067	2.835	.486	.297
14.00	.070	2.940	.504	.308
14.50	.072	3.045	.522	.319
15.00	.075	3.150	.540	.330
16.00	.080	3.360	.576	.352
17.00	.085	3.570	.612	.374
18.00	.090	3.780	.648	.396
19.00	.095	3.990	.684	.418
20.00	.100	4.200	.720	.440
25.00	.125	5.250	.900	.550
30.00	.150	6.300	1.080	.660
35.00	.175	7.350	1.260	.770
40.00	.200	8.400	1.440	.880
50.00	.250	10.500	1.800	1.100
60.00	.300	12.600	2.160	1.320
75.00	.375	15.750	2.700	1.650

is a very fair average to use for purposes of comparative analysis as follows:

- (a) 1 cubic foot of natural gas contains 1,000 B. T. U.
- (b) Gas (and oil) being hydrocarbon fuels burn partly to water which, being transformed into steam, absorbs heat and leaves only 875 B. T. U. per cu. ft. effective for heating purposes.
- (c) Available heat content of 1 M of natural gas is 875,000 B. T. U.
- (d) Transporting 875,000 B. T. U. (1 M of gas) 100 miles is a transportation service of 87,500,000 "B. T. U. miles."
- (e) Cost of 87,500,000 "B. T. U. miles" is 2½ cents (as estimated above).
- (f) "B. T. U. miles" of gas transportation service produced for one cent—35,000,000.
- (g) Available heat per lb. of average quality coal—12,500 B. T. U.
- (h) Available heat per ton of coal—25,000,000 B. T. U.
- (i) Heat transportation service in moving 1 ton of coal 1 mile—25,000,000 "B. T. U. miles."
- (j) Average railway revenue from coal per ton mile—6⅔ mills.*
- (k) Heat transportation service performed for 1 cent by railway @ 25,000,000 "B. T. U. miles" for 6⅔ mills—37,500,000 "B. T. U. miles."

* There are many coal rates lower than this, viz.: Southern Illinois to Chicago, rate \$1.90 per ton, mileage 320, or 5.9 mills per ton mile; West Virginia coal fields to Chicago, \$3.29 per ton for 600 mile haul, or 5.5 mills per mile, etc.

It therefore appears that 1 cent will purchase the transportation of 7 percent more heat if shipped in the form of coal by rail than if sent in the form of gas through a pipe line. In this comparison it should be noted that gas transportation costs with line at full capacity operation are compared with the selling prices of rail service.

If the lowest coal rates (5.5 mills per ton mile) are compared with the lowest gas transportation costs (2.2 cents per M per 100 miles) 1 cent will buy 14 percent more heat transportation if shipped as coal. This favorable percentage becomes even more advantageous to the railways if it is applied to high-quality coal rather than to that of the average heat content considered herein.

Coal at Mines Cheaper than Gas at Wells

The relative costs of the two fuels at the sources of production are also vital factors. The "run of mine" average cost of production in the principal bituminous coal fields of the country is \$1.50 per ton. This average will be used for comparative purposes, although the industrial fuel of the nation is "screenings" which is 40 percent of the total output and sells at the mine for \$1 per ton or less. Gas is sold at the wells at highly variable rates and it is accordingly very difficult to get any precise figure which may be considered as a representative price of this commodity. It is understood that 6 cents† per M should be realized for profitable production and distribution. At this quotation, heat equivalent to 1 ton of ordinary coal (25,000,000 B. T. U.) will cost \$1.70.

It appears that heat in the form of gas is not as cheap at the wells as heat in the form of coal at the mines. Long haul transportation is more economical per mile for heat in the form of coal, and coal has the great advantage of being much nearer most of the major centers of industry and population. Local distribution is also cheaper for coal if we may accept the testimony of gas companies in rate cases which estimate 40 cents per M for such service.

The industrial coal of the eastern half of the United States is "screenings" or "slack." The average price is around \$1 per ton at the mines. A \$2 freight rate car-

ries industrial coal about 300 miles. Only New England is located at a greater distance from a major soft coal field. A delivered price of \$3 per ton on screenings is the average cost of industrial coal in that great section of the United States where consumption is heaviest. A \$3.50 per ton delivered price will include almost every point located nearer the more distant boundaries.

\$3 Coal Equivalent to Gas at 10.8 Cents

Table I shows that \$3 per ton coal is equivalent to a 10.8 cents per M. cost for natural gas and \$3.50 per ton coal is comparable to 12.6 cents per M. for natural gas. From the domestic standpoint 72 cent natural gas is equal to low grade soft coal at \$20 per ton. There is scarcely a place in the central part of the United States where domestic bituminous coal cannot be purchased for less than \$10 per ton. Selling natural gas in the Southwest, close to the wells, where coal is high and gas is cheap is a very different thing from piping it to the Eastern half of the country, into an already over-crowded fuel market where coal is very cheap.

Most natural gas is sold as having 1,000 B.T.U. per cu. ft. Sometimes it is even said to have nearer 1,100 B.T.U. per cu. ft. However, it should be remembered that gas expands with rising temperature. Therefore the lower the temperature the denser the gas and hence the greater B.T.U. per cu. ft. Gas is customarily measured on the basis of heat content per cu. ft. at atmospheric pressure, at 32 deg. Fahrenheit, the freezing point of water, or 60 deg. Fahrenheit which is a normal average temperature. When gas advocates speak of B.T.U. content they customarily use a figure based on 32 degrees temperature, although it is measured at 60 deg. Fahrenheit when sold. A typical specimen of Louisiana natural gas (98 per cent methane), contains 1,008 B.T.U. per cu. ft. at 60 deg., which is what the buyer will normally get, although at a temperature of 32 deg., the freezing point of water, a cu. ft. would contain 1,065 B.T.U. Gas from Texas generally has a slightly lower heat content than that of Louisiana. It is a conservative statement that the great gas deposits of the Southwest have an average quality of only 1,000 B. T. U. per cu. ft. at normal temperature and pressure. Gas of higher quality is found, but that which will be piped the long distances from the Southwest is not of this superior grade which is available in relatively small quantities, mostly in the small gas fields of the East. However, higher quality gas than average for the Southwest is often mentioned by gas advocates in such manner as to lead the uninformed to think it is representative of the whole.

Burning Gas Produces Water

A heat content of 1,000 B.T.U. per cu. ft. is a high value which is only theoretically obtainable. Natural gas obtains more than one-half of its heat value from hydrogen. Hydrogen burns to water; 1,000 cu. ft. of gas burns to approximately 96 lbs. of water. This water is turned into steam in the fire box and carries away a large percentage of the heat in natural gas. Sufficient natural gas to equal one ton of average grade coal, would make in combustion, 2,660 lb. of water or about 320 gal. The effect of this is the same as pouring an equal quantity of water on a coal fire during the burning of one ton of that fuel. For the above reason there is both a high and low B.T.U. value for natural gas. The high value is what is theoretically present; the low value is what is obtainable after deducting water loss. The low value is never quoted by natural gas advocates. The actual value of 1,008 B.T.U. natural gas is only 873 B.T.U. of effective heating capacity. Tables I and II show natural gas

† The Department of Commerce 1930 Yearbook states that gas at the wells had an average value of 8.9 cents per M in 1928.

computed on a 900 B. T. U. basis in order to make very liberal comparisons.

There is moisture present in all coal and hydrogen compounds comprise its volatile matter. This results in a similar loss of B.T.U. value in coal. However, in the cases of maximum losses of this character, only 4 per cent of the heat of coal is dissipated and it is usually 3 per cent or less. This is 375 B.T.U. per lb. of 12,500 B.T.U. coal as received. It is not necessary to specifically consider it in each of our calculations herein because generous allowance has been made for this in taking as low an average B.T.U. content of coal as 12,500 B.T.U. per lb. and raising the gas content to 900 B.T.U. per cu. ft.

Oil is also a hydro-carbon fuel in which the hydrogen burns to water. One gallon of oil makes over a gallon of water in the process of combustion. This reduces the quoted heat value of oil under actual burning conditions in a similar manner with natural gas but to a lesser extent.

Omaha Finds Natural Gas too Costly

The City of Omaha owns its municipal gas system. It has twice refused to distribute natural gas offered it by trunk lines on the basis of over 30 cents per M. This price was considered excessive in comparison to cost of production of artificial gas. The most recent popular vote on the proposal was held November 26, 1930. Natural gas was rejected by a vote of 35,498 to 5,117; a seven to one defeat. In Oklahoma City, where hundreds of millions of cubic feet of gas are going to waste daily, the local company distributing gas made a rate to

the public schools that would average 26 cents per M. The school board, after an exhaustive analysis of fuel values, continued to heat the schools with coal and is now putting in additional coal burning equipment. The school boards of Enid, Okla., and Emporia, Kansas, have also recently rejected natural gas for coal.

The city of Pittsburgh has had natural gas continuously for over forty years, but coal is the great industrial fuel and its supremacy has never been affected by gas. Natural gas does not seem to be seriously considered as an industrial fuel in the heart of the steel empire. In the steel mills, great quantities of gas are required for furnaces and soaking pits but the gas used is "producer gas" made from coal at the plant where burned because it is cheaper per 1,000,000 B.T.U. than any natural gas obtainable.

Gas, in any form, is an expensive fuel and only in the realm of the imagination is natural gas competitive with coal where coal is now available at moderate prices. The so-called "form value" i.e., convenience, of natural gas has to be greatly exaggerated in order to make it competitive. At present the form value and convenience of natural gas and oils is being destroyed by the advent of the small coal stoker. There are now over fifty-five manufacturers of small stokers, which are made for the residence, small apartment and all larger uses, making automatic heat practical, convenient and laborless, with coal. These small automatic stokers burn coal with maximum efficiency cutting already cheap fuel costs very materially. It is a significant fact that the sale of small stokers has increased greatly during the dull year of 1930. It is one

TABLE II—Fuel Statistics Equated to Common Bases

	1929 Production Millions of cu. ft.	% of Total	Average Net Per cu. ft. available B.t.u.	Equivalent Heat, Total B.t.u. in billions	Millions of KWH. that fuels could produce at 20,000 B.t.u. per KWH.†	Equivalent Tons of Average Coal at 25,000,000 B.t.u. to the ton	Comparison of amount of fuels used to pro- duce heat or steam in U. S. outside of oil and gas industry re- duced to the unit of tons of coal. The ac- tual net picture of the competitive fuel situa- tion	
							Tonnage	Percent
Natural Gas								
(a) Total U. S. production (less exports)	1,917,451	100%	900*	1,725,705	86,285	69,028,236		
(a) Used in field in production of oil, gas and natural gasoline	705,083	37	900					
Remainder available for general use	1,212,368	63	900	1,091,131	54,556	43,645,248		
(a) Used for production of "Carbon Black"	261,107	14	900					
(a) Burned by petroleum refiners	103,729	5	900	93,356	4,668	3,734,224(f)		
Balance used outside oil and gas industry	847,532	44	900	762,777	38,144	30,511,112		
(a) Burned by public utilities	112,707	6	900	101,436	5,077	4,057,440(g)		
(a) Burned for general industrial uses	374,972	19	900	337,474	16,874	13,498,992		
Domestic consumption	359,853	19	900	323,867	16,193	12,954,680(h)	30,511,112(i)	4.2%
Production of Electricity	97,352		3,412	332,165		77,881,600		
(b) Total KWH. (Government estimate)	Millions of KWH.		Per KWH.					
(b) Production by Utilities	120,000		3,412†	409,440		96,000,000(d)		
Coal								
(b) Bituminous	532,352,000		Per ton	13,308,800	665,440	532,352,000		
(b) Anthracite	76,640,000		25,000,000	1,916,000	95,800	76,640,000		
Total Coal	608,992,000			15,224,800	761,240	608,992,000	608,992,000(j)	83.7%
(c) Average Present Fuel Oil Consumption in U. S. (all burning oils)								
(c) Refined fuel oils	400,000,000		Per Bbl.	2,100,000	105,000	84,000,000		
(c) Crude oil burned	20,000,000		5,250,000	105,000	5,250	4,200,000		
Total burning oils	420,000,000		5,250,000	2,205,000	110,250	88,200,000	88,200,000	12.1%
							727,703,112	100.0%

NOTES:

- (a) From Department of Commerce Publication, October 9, 1930.
- (b) From Department of Commerce Year Book, 1930.
- (c) Round figures from American Petroleum Institute's estimate of average annual consumption.
- (d) Coal or equivalent in tons required to produce KWH., on basis of 20,000 B.T.U. per KWH. (It took average of 21,125 B.T.U. in 1929.)
- (e) The Oil Conservation Board proposes to return half of this amount to the other fuels in next several years.
- (f) Used by oil refineries mainly in West and Southwest which would otherwise use oil—not competitive with coal.

- (g) Used by utilities in West and Southwest—only remotely competitive with coal.
- (h) Large percentage used in cooking ranges where gas has reigned supreme for years. Therefore only partially competitive with coal.
- (i) The National Coal Association estimates that natural gas is used competitively with coal as fuel to an extent of not exceeding 20,000,000 tons—doubtless eliminating the amounts used in the oil refining industry, by utilities in the West and Southwest and consumed by domestic cooking ranges.

- (j) Exports not deducted as they are small but constant and railroads get a substantial haul out of all coal exported.

* Effective heat content, in round figures, adjusted for loss due to water formed during combustion.

† While theoretically 3,412 B.T.U. = 1 KWH., over 20,000 B.T.U. of heat are required to generate 1 KWH. Also see note (d).

of the few industries that has enlarged its volume by a wide margin. The installation of small stokers, which give automatic and laborless heat with coal, at a small fraction of the cost of competitive fuel, robs natural gas and oil of the convenience argument for the small user. The former devices burn the cheapest grades of bituminous coal entirely without smoke and are an economic development with far reaching consequences to the coal industry, and hence to the railroads.

Coal Properly Burned Is Most Efficient Fuel

The favored argument of oil and gas interests is that the efficiency obtainable with oil and gas is so much higher than with coal that it off-sets the initial high price of heat with their fuel. This is untrue. Coal automatically burned in proper equipment is actually more efficient than either oil or gas under the same conditions.

Fernald and Orrok in "Engineering of Power Plants" state "efficiency as high as 72 per cent to 75 per cent is seldom obtainable (with gas) under most expert conditions. Air dilution is greater with gas than with coal, so possible coal efficiencies are impossible with gas." It is well known that 75 per cent efficiency is readily obtainable with coal. Coal is capable of making a 10 per cent higher furnace temperature than can be obtained with artificial or natural gas, viz.

	Ignition Temperature	Temperature produced by perfect combustion @ 60° temper- ature in air	Air required for complete perfect com- bustion to produce 10,000 available B.T.U.
Anthracite	925°F		
West Virginia smokeless coal	870°		
Bituminous coal	766°		
Average, all coal	790°	5012°	7.88 Lb.
Natural gas	1202°	4329°	8.31 "
Natural gas in fur- nace conditions	1463°		
Oil	1000°	4910°	8.48 "

Actual boiler tests made by the largest utilities in the most modern boiler plants which are capable of the highest efficiencies yet attained show:

Operating Company	Fuel	Overall boiler efficiency
Detroit Edison Company	Coal	90.5%
Pacific Gas & Electric Company	Oil	87.0%
Pacific Gas & Electric Company	Gas	84.0%

All of these plants are equipped with super-heaters, economizers and air pre-heaters and have large furnace volumes. The Pacific Gas & Electric plants can therefore burn oil and gas with less excess air than the average generating station and can extract more heat from stack gases. The efficiency of oil and gas under such conditions is much closer to coal than is possible in an ordinary plant. According to these tests coal can be burned 7.7 per cent more efficiently than gas under the best conditions for gas. In ordinary boilers, not equipped with air pre-heaters, economizers and super-heaters in the path of the stack gases, it is conservative to say that the average boiler efficiency with gas is 12 per cent less than with coal and with oil is 6 per cent less than with coal.

Are Gas Pipe Lines Overcapitalized?

It is interesting to note that natural gas lines are often capitalized so highly that their bonded debt and/or market value per mile approaches that of important railways. The stated cost per mile of the gas line under construction from Texas to Chicago, is much in excess of the capitalization per mile of the Atchison, Topeka & Santa Fe Railway. This is surprising in view of the limited

transportation capacity of a pipe line compared with that of a railway!

"The Lamp," an official organ of the Standard Oil Company of New Jersey states that \$4,000,000,000 is invested in the natural gas industry. As shown in Table II the total 1929 output of natural gas was equivalent in heat content to 69,000,000 tons of coal. By far the greater part of the investment in the natural gas industry is in the production and distribution of gas to industrial, public utility and domestic consumers. Heat equivalent to 30,500,000 tons of coal was furnished this group last year. It is reasonable to assign \$3,000,000,000 of this total investment to the latter class of service. The capitalization is at the rate of approximately \$100 per equivalent ton of coal.

The investment in the coal industry is \$4 per ton of annual production. The Interstate Commerce Commission estimates that the capitalization of that part of the railways' plant and equipment utilized by the coal traffic is \$8 per ton. Thus the total investment in production and transportation facilities of coal is \$12 per ton. The equivalent capitalization of natural gas is \$88 per ton greater. The interest on this excess at 5 per cent is \$4.40 which is greater than the delivered cost per ton of the average industrial fuel.

Oil Reserves Needed for Gasoline

In an article appearing in the November 6 "Oil and Gas Journal" entitled, "Decline in Fuel Oil Supply as Gasoline Recovery Increases," the following appears:

The conservation program for crude oil is based on three main propositions, namely, that the supply of crude oil should be considered as limited from the viewpoint of future needs, that motor fuel and lubricants are the most essential oil products since fuel oils can be more readily replaced by coal.

A decline of 50 percent in the fuel oil supply in the United States based on the situation in 1928 would mean a decrease from 400,000,000 bbls. to about 200,000,000 bbls. The decrease in domestic consumption to be replaced by other sources of energy would be about 160,000,000 bbls., equivalent to about 45,000,000 short tons of coal.

It is apparent from the above that those in charge of the oil conservation movement propose to return voluntarily to coal, 45,000,000 tons of business by cracking and hydrogenating fuel oil into gasoline. Fuel oil has been losing out to coal for several years. Many large industrial plants on the border line have turned back to coal. Innumerable small commercial establishments, hotels, apartment houses, etc., that accepted tank wagon deliveries of fuel oil have returned to coal. The small automatic coal stoker has returned thousands of such users to coal in the last year. In this class of establishments coal is making headway against both oil and natural gas right in the heart of the oil and gas fields.

Modest Claim for Gas as Boiler Fuel

The Joint Committee of National Utility Associations recently stated: "The Business Week," conducted a nation-wide investigation with natural gas producers, pipe line executives, householders, industrialists and Chambers of Commerce, after which they printed the results of their investigation under the title, 'Natural Gas Finds Best Market Among Industrial Consumers.' The conclusions were summarized as follows:

- 1: Natural gas is to be the industrial fuel in all parts of the country, except New England and the Pacific Northwest.
- 2: Natural gas will never be used as a boiler fuel except within 200 miles of gas fields.
- 3: Natural gas will never displace artificial gas for domestic cooking or heating except in cities where cheap blast furnace gas can be mixed with natural gas. Few places can hope to get natural gas for domestic use at rates cheaper than are now paid for artificial gas.

4: Natural gas will not be sold cheaply enough to permit its general use as a house heating fuel except near the source of supply.

This information coming from the Joint Committee of National Utility Associations is most enlightening and should be completely reassuring to the railways. It is said that gas is to be the industrial fuel of the nation, yet it is not expected to compete with coal as a boiler fuel, except within close range of the gas fields and these in turn are far removed from the great centers of population and industry of the Eastern and Central sections of the country. *The bulk of the industrial coal consumption is for boiler fuel.*

The field of industrial heat not directly connected with production of steam is

- 1: Open hearth furnaces, heating furnaces and soaking pits in steel mills.
- 2: Heat treating, annealing furnaces, etc., and the glass industry.
- 3: Refractory and cement industries.
- 4: Bake ovens.
- 5: Miscellaneous industrial processes that use "raw heat" (not in the form of steam) at a uniform rate.

Only items Nos. 1 and 2 above require gas. In Pittsburgh the steel industry has thrown out natural gas and makes producer gas out of coal because it is cheaper. Producer gas delivers nearly 90 per cent of the heat in coal in the form of gas at a total processing cost of less than 70 cents per ton including all maintenance, depreciation and interest charges. The large users of this type of heat are in St. Louis, Illinois, Michigan, New York, Indiana, Ohio, West Virginia and Western Pennsylvania. Each of these manufacturing areas is almost sitting on top of a big coal field where coal is phenomenally cheap. Industries there make producer gas at a price which will make even 20 cents per M. natural gas a high priced fuel.

In the refractory and cement industries, natural gas must compete with coal directly on a comparative heat basis. The kilns can be fired with coal as efficiently as with gas. If gas cannot compete as a boiler fuel, it is no less handicapped as a producer of direct heat.

Coal is generally suitable for uses of classes 4 and 5 but if not, artificial gas can be made in the eastern and central cities cheaper than natural gas can be piped from Louisiana and Texas.

Domestic Heating Has Difficult Peak Load

It is quite obvious why natural gas interests do not want a domestic heating load. This is nil for about one-half of the year. December and January take over 40 per cent of the year's heat load with the coldest days requiring 50 per cent excess over the daily winter average. Not even one day's demand for gas can be stored at destination, so this limitation can only be overcome by installing a capacity ever ready to serve the peaks. The domestic requirement allotment of the capacity of any natural gas line will operate over the year at an average of not over 25 per cent of the required maximum. As the financial charges are by far the predominant costs in transporting gas, this transforms a cost of 2½ cents per M. per 100 miles for full capacity of line into an expense of 10 cents. This in turn causes 50 cents per M. average cost for transporting gas 500 miles and \$1.00 at the end of 1000 mile line. Add 40 cents per M. for local distribution and a profit and the consumer must pay \$0.90 per M. for natural gas for domestic heating even at the end of a 500-mile line. This price is equivalent to \$25 a ton for coal. Small wonder that "The Business Week" and the Joint Committee of National Utility Associations are not enthusiastic about the domestic heating field.

Seldom has a live tiger's skin been sold more recklessly than when the statement is made that natural gas will soon be "the industrial fuel of the nation." Across the country, east and north from St. Louis is the great industrial district of the nation. The natural gas pipe lines must compete with \$2 to \$3.50 per ton delivered coal at every point. If natural gas is going to be "the industrial fuel of the nation," it is going to be very cheap gas. From 7 cents to 15 cents per M. will be the price range, depending upon the location of each individual city with respect to the coal fields. The coal trade will never give up any part of the business, even a relatively small tonnage, without a struggle.

The pipe lines are not bringing gas 500 to 1000 miles to sell for 10 cents or 15 cents per M., and yet that is the limit of the price possibilities in the industrial districts of the United States if coal is to be superseded. Bringing natural gas long distances to the cheapest and most overcrowded fuel markets in the world is the most nearly perfect example of the discredited practice of "bringing coals to New Castle." The natural gas interests propose not only to do that but to command a premium price!

I. C. C. Urges Regulation of Forwarding Companies

WASHINGTON, D. C.

AN investigation conducted during the past year by the Bureau of Inquiry of the Interstate Commerce Commission has disclosed an urgent need of legislation to subject freight forwarding companies to the regulatory provisions of the interstate commerce act, the commission says in its annual report.

During the past few years the business of forwarding companies has expanded rapidly, and many new concerns have entered the field. The investigation has disclosed, also, that several of the more important of these forwarding companies have come, directly or indirectly, under the domination of railroad companies subject to our jurisdiction. In general, this domination has been brought about through the medium of subsidiary or affiliated holding companies. "It appears to be a phase of the intense railroad competition now prevailing for traffic between the important centers of population and business," the report says. "Our investigation has further disclosed that owing to this keen rivalry for traffic the forwarding companies do not adhere to their published rates. It is common practice on their part to grant concessions from these rates where necessary to secure the business, and this is done in various ways and through various devices. Even cash payments to industrial traffic managers are not unknown.

"The result is that shippers of less-than-carload freight, more particularly in the larger cities, are today confronted with a situation similar to that which existed in respect to railroad rates prior to the enactment of the act to regulate commerce, and even thereafter until the amendatory legislation of 1903 and 1906. That is to say, there is no stability in the rates of the forwarding companies, and a shipper has no means of knowing definitely what rates his competitors, or even he himself, will have to pay these companies from day to day for the carriage of less-than-carload shipments. This situation has been intensified by the fact that to the competition of the forwarding companies with each other there has now been added the competition of the railroad companies under whose domination they

are rapidly coming, and by the further fact that the forwarding companies, due to this domination, in many instances are no longer dependent wholly upon their own financial resources.

"It is possible that to some extent the evils of this situation can be reached through the Elkins Act or the provisions of other statutes which we administer; but the indirection with which railroad domination of the forwarding companies has in general been brought about presents obstacles to such action. A more effective way of dealing with the situation is to extend our jurisdiction over the forwarding companies, a course which we believe to be legally practicable. Our investigation has disclosed that the business of the forwarding companies is in such a general state of chaos that many of them, and the rail carriers which dominate them, favor legislation of this character as the best means of stamping out practices which have resulted in serious depletion of revenues and unequal and unjustly discriminatory treatment of shippers.

"We recommend, therefore, that the interstate commerce act be amended so as to require that the rates, rules, regulations, and practices of forwarding companies which are engaged in interstate commerce shall be just, reasonable, nondiscriminatory, and not unduly preferential or prejudicial; to require such forwarding companies to file with us and strictly observe published schedules of their interstate rates and charges; and to provide penalties for departure from such schedules, or for the granting of concessions, rebates, or the like to any shipper by means of any device and to provide that the administrative machinery of the interstate commerce act shall be applicable for the enforcement of the duties so imposed."

Development Association Meets at Chicago

A RESOLUTION recommending that those of the unemployed who are competent be placed on farms as a means of relieving unemployment, was passed by the members attending the twenty-second semi-annual meeting of the American Railway Development Association at the Hotel Sherman, Chicago, on December 4 and 5. The resolution also directed the president, Russell G. East, agricultural agent of the Pennsylvania, to appoint a committee to formulate plans whereby interested unemployed may be offered the opportunity of returning to the farms to make a livelihood. Another feature of the program was an address by R. H. Aishton, president of the American Railway Association, in which he presented the attitude of the railroads towards unregulated forms of competition.

As in previous years, the program was divided into general sessions in which industrial and agricultural men convened separately. At a luncheon on the first day, W. A. Cochel, managing editor of the Kansas City Weekly Star, spoke on "Interesting Developments in Agriculture."

During the general session on the second morning, Robert England, western manager of the department of colonization of the Canadian National, spoke on the "Contribution of Rural-minded Peoples to Railway and National Development." He urged development men to take advantage of the primitive urge to return to farms, which prevails among many of the inhabitants of cities.

Tampton Aubuchon, manager of the industrial development department of Henry L. Doherty & Co., spoke on "Community Advertising," saying that the main fault in advertising localities was an ignorance of the fundamentals of advertising. He said that many individuals preparing advertising copy felt that each piece of copy should be different from the previous, thereby overlooking the fact that repetition in advertising is a most effective means of securing results.

At the Industrial Section session, A. A. Schmidt, industrial agent of the Central Manufacturing District of Chicago, described the development of industrial property in Chicago and cited the advantages of providing facilities for industries. He said that the first industrial development was started by a group of 20 individuals on a property that was formerly a cabbage patch, and the success of this venture resulted in the development of three other parcels and plans to develop a fifth section of 400 acres in the near future.

Another subject which was given considerable discussion was that of zoning. The Zoning committee reported that a need for suggestions to guide industrial men in zoning property in cities and towns existed. The discussion of the subject indicated that, in a majority of cases, zoning is promoted by real estate men who disregard the needs of industrial locations and zone property along railroads for residences, thereby doing harm to the community and the railroad. It was recommended that the committee make an investigation of zoning and compile a list of suggestions which can be used by industrial men in order to protect the railroads' interests. Other subjects considered at the Industrial Section meeting were "Changes in the Industrial Field," by C. S. Chase, industrial agent of the Louisville & Nashville; "Relation Between Agricultural and Industrial Development," presented by J. B. Lamson, manager of the commercial department of the Chicago, Burlington & Quincy; "The Future of the Railway Industrial Man," presented by M. C. Burton, general industrial agent of the Atchison, Topeka & Santa Fe; and "The Industrial Man as a Traffic Solicitor," portrayed by J. R. Ablett, industrial agent of the Delaware & Hudson.

The subjects considered by the Agricultural Section dealt entirely with problems of that industry. The subjects included: "Some New Developments in Livestock Marketing," presented by Ray E. Miller, director of livestock marketing of the Illinois Agricultural Association; "A Square Deal for Meat in the Diet," by R. C. Pollock, general manager of the National Livestock and Meat Board; "Recent Developments in Farm Management and What It Means for the Future," by D. Howard Doane of the Doane Agricultural Service; and "The Effect of the Business Depression Upon Agriculture," by Dr. O. C. Stine, principal agricultural economist in charge of the division of statistical and historical research of the bureau of agricultural economics of the United States Department of Agriculture.

GOOD PRACTICE in the management of marine oil terminals is the subject of a small 15-page pamphlet which has been issued by the National Board of Fire Underwriters, 85 John Street, New York City. The requirements, from the point of view of the fire prevention engineer, are set forth in great detail, dealing with oils of all grades. The discussion covers piers and wharves at which tankers and barges load and unload; terminals at which bunker fuel oil is handled, and oil stations for barges and small craft.

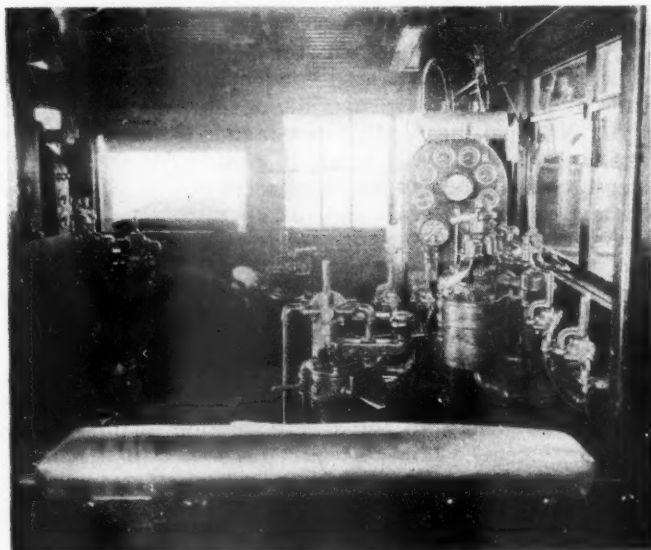
Milwaukee Tests Whitcomb Oil-Electric Switchers

High availability and rapid acceleration are outstanding characteristics

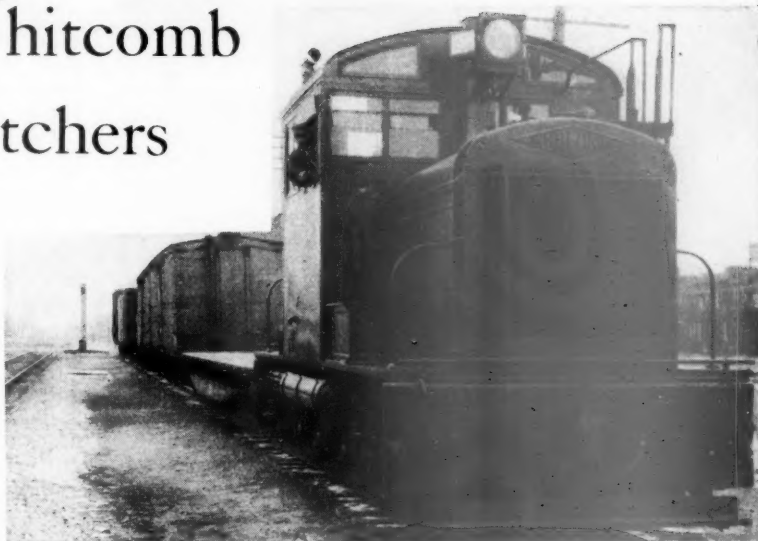
TWO 90-ton oil-electric switching locomotives, built by the Geo. D. Whitcomb Company, Rochelle, Ill., for the Chicago, Milwaukee, St. Paul & Pacific, have been in service for a number of months at the Kinzie Street (Chicago) yards of that road, performing heavy industrial switching with economy and dispatch and demonstrating marked flexibility in meeting widely-divergent load and operating conditions. In addition, the locomotives have reduced substantially the smoke and noise which usually proves such an objectionable feature of steam switching operations in a congested urban community.

A study of the performance of a steam locomotive in similar service over a 24-hr. period indicated a maximum power demand of approximately 500 hp. for handling the peak loads, with an average demand of only 66 hp. over a 24-hr. period. Therefore, in designing the Whitcomb oil-electric locomotive, dual power plants, of 300 hp. capacity each, were used, with controls so arranged that both power plants can function as a unit when handling peak loads, or independently of one another to meet the lighter load requirements.

In regular daily service, it was found that the maximum available power of the locomotive was used only 10 per cent of the total operating time and that 90 per cent of the entire service could be performed with one power plant cut out. This factor alone has effected considerable savings in operating cost by lowering the fuel consumption per locomotive hour, increasing the thermal efficiency of the engine and reducing maintenance costs.



Interior Cab View Showing Dual Control Stations and Equipment



A Whitcomb Oil-Electric Locomotive in Industrial Switching Service on the Milwaukee

While originally designed as an 80-ton machine, each of the Whitcomb switchers actually weighs slightly over 90 tons and develops a maximum tractive force of 45,000 lb. at starting. Power is furnished by two Waukesha 300-hp., six-cylinder oil engines equipped for the present with carburetors to burn gasoline. The engines are direct-connected to two Westinghouse 600-volt generators which furnish power to four 230-hp., self-ventilated traction motors. Each of these motors is geared to a driving axle through single-reduction spur gearing. The axle journals are mounted in roller bearings to minimize friction and wear, the Timken tapered roller type being used. The locomotive spring rigging is side-equalized and cross-equalized to permit safe operation over rough track. Curves in excess of 22 deg. can be negotiated.

The cab elevation and design are such as to provide clear vision in all directions. Cab controls are located so that the operator can work from either side of the

General Dimensions of Whitcomb Oil-Electric Switcher

Type	0-8-0
Weight on drivers	182,780 lb.
Size drivers	38 in.
Journal bearings, 6 in. by 11 in.	Timken
Wheel base rigid	13 ft. 6 in.
Wheel base total	13 ft. 6 in.
Length, center to center of coupling	29 ft. 6 in.
Length over cab	8 ft. 0 in.
Height over all	15 ft. 2 in.
Width over all	10 ft. 6 in.
Starting tractive force, maximum	45,500 lb.

cab, transferring to either control station easily and without loss of time. This arrangement permits of one-man operation, effecting a substantial reduction in crew expense.

Service Performance on the Milwaukee

The Whitcomb oil electrics, when delivered to the Milwaukee, were placed in service on the lead of a classification yard, replacing consolidated type steam locomotives weighing 189,000 lb. on the drivers and having a tractive force of 43,000 lb. They were operated during unusually severe weather in the early part of the present year, successfully handling the work previously performed by the steam locomotives. On one day when the temperature range was between zero and 10 deg. F. above, 341 cars were handled by one locomotive in 6 hr. 40 min. actual switching time.

It was noted that the oil-electric locomotives do not handle cuts of 25 to 30 cars quite as rapidly as steam



The Visibility from the Operator's Seat is Excellent

power, but this loss is overcome by more rapid acceleration and less loss of time when changing the direction of motion when cuts of approximately 15 cars are being switched. In all industrial districts where smaller cuts of cars are handled and the work consists of supplying switching service to industries and wholesale houses over quite a large territory, the oil-electric will handle more work in a given period of time than can be performed by an O-6-0 switching locomotive weighing 125,000 lb. on the drivers and having a tractive force of 28,000 lb.

The industrial assignment of switching power at the Kinzie street yard covers a period of 24 hr. daily except Sunday and it has been found practicable to assign the oil-electric locomotive to 24-hr. service and work it through the entire six days without relief, using the time between Saturday afternoon and Monday morning for needed repairs.

Fuel, sand and water are provided once each 24 hr. between change of shifts, thus eliminating the necessity of sending a relief locomotive and crew after each 16-hr. period, as required with steam locomotives, in order that they may be returned to the enginehouse for fire cleaning and repairs.

The standby expense of relief steam power is also avoided, as well as the cost of one locomotive turn each 24 hr. It, therefore, becomes practical for two oil-electric locomotives to perform exactly the same amount of work previously performed by three steam units. Further savings are effected by the reduced crew expense, lower cost of fuel and reduced cost for mechanical repairs.

Still another operating advantage is the increased time which the oil-electric locomotive can be employed actually moving cars, particularly in winter when the operation of steam power on spur tracks and around buildings is considerably delayed, due to smoke and exhaust steam obscuring the switching crews' vision to the extent that movements are slow and, in some cases, stopped for several minutes until the smoke and steam clear away.

Control of locomotive speed and the various electrical circuits is accomplished by the use of a Westinghouse electro-pneumatic control system which consists of

master controllers conveniently located in the cab at dual operating positions which operate unit switches and relays grouped together in a control cabinet located above each generator unit and which, through a throttle-operating device, operates the engine throttle so as to vary the engine speed. Each generator acts as a series motor to start its engine when connected across the battery through its series starting field. The starting circuits are controlled by magnetic contactors which in turn are remotely operated from the controller.

The main generator also charges the battery at engine idling speeds. A protective relay prevents the closing of the charging circuits until the generator voltage reaches a predetermined value, thus preventing damage to the battery due to having excessive voltage applied to it.

Cut-out switches are supplied in both the control and the battery circuits, enabling the operator to close the battery circuit for testing purposes or to cut out any one of the four traction motors at will.

All indicator meters, gages, starting buttons, priming devices, control levers and brake valves are so located with respect to the engineman that all operations such as cutting in or out of a power plant, and control of the locomotive can be effected without leaving the engineman's seat. Duplication of all control apparatus enables the crew, as stated, to work from either side of the locomotive and yet be in full view of the engineman at all times.

Thorough ventilation of the cab and engine cooling is secured by a push-type fan which draws all air and exhaust fumes from the engine compartment, forcing it out through radiators mounted at the front of each unit. All gases from the engine exhaust are carried through stacks well above the roof of the cab.

The air brake schedule is the Westinghouse Type EL combined automatic and straight air with distributing valve located in the cab, providing easy accessibility for cleaning or repairs. Air compressors are the Gardner-Denver type of 59-cu. ft. per min. capacity, belt driven from the power take-off at the front of each engine.

The fuel capacity is 400 gal., with tanks so located as to provide easy access for refilling and a capacity large enough to meet all the demands of the most severe service for a full 24-hr. period or longer. The batteries for electrical engine starting, initial generator field excitation, headlights, cab lights and control apparatus are of the Exide MVH type, having a 300-amp.-hr. capacity. Sanders, of the latest Graham-White type, are designed to assure adequate sanding of the rails at all times when maximum adhesion is required. Pyle National headlights of standard railway design are used, one at each end of unit. All steps, grab handles and other safety appliances are designed and built to conform with I. C. C. requirements.

Another noteworthy feature of the Whitcomb locomotives is the Vapor self-contained heating plant, mounted within the cab and so arranged that ample heat is provided for the engineman during cold-weather operation. During layover periods, in freezing weather, warm water from the heater is allowed to circulate through radiators and cylinder blocks, eliminating the necessity of using an anti-freeze solution in the engine-cooling system.

To promote easy starting and insure instantaneous flow of warm oil, when starting, to all engine bearings, all crankcase oil is pumped back into a main supply tank which is kept heated from the hot water heating unit and returned to the crankcase only as needed.

Fifty - First Annual Meeting of the A. S. M. E.

*Papers on high-pressure steam, pulverized fuel and
action of freight-car trucks contributed by
Railroad Division*

A TOTAL of 2,657 registered at the fifty-first annual meeting of the American Society of Mechanical Engineers, which was held in the Engineering Societies' Building, 29 West Thirty-ninth Street, New York, December 1 to 5, inclusive. The meeting this year was featured by a series of three lectures on public speaking for engineers by Dr. S. Marion Tucker, head of the Department of English, Brooklyn Polytechnic Institute, an exhibit of paintings, etchings and sculpture done by members of the society, an exhibit of inventions by the late Elmer A. Sperry in the Museum of the Peaceful Arts and a general conference on employment, which was undertaken at the request of Col. Arthur S. Woods, chairman of the President's Emergency Committee for Employment. The problem was presented by Col. Woods and L. W. Wallace, executive secretary of the American Engineering Council at a meeting on Monday afternoon, December 1. Roy V. Wright, managing editor, *Railway Age*, and editor *Railway Mechanical Engineer*, was inducted into office as president of the society for 1931 on Tuesday evening, December 2. The annual dinner to new members was held at the Hotel Astor the following evening.

Fourteen professional divisions of the society presented a total of 72 papers and reports on a variety of mechanical engineering subjects. In addition to the sessions sponsored by the professional divisions, reports were presented by a number of research and technical committees. The A.S.M.E. held a joint session with the American Society of Refrigerating Engineers on Friday afternoon, December 5, at which two papers were presented. Inspection trips to various manufacturing plants and power stations were arranged for each afternoon during the five-day meeting. The ninth national exposition of power and mechanical engineering was held during the same week in the Grand Central Palace, New York.

Railroad Division Holds Two Sessions

Three papers and a report of progress in railway mechanical engineering during the past year were presented at two sessions of the Railroad Division, which were held in the morning and afternoon of Tuesday, December 2. The morning session was under the chairmanship of A. F. Stuebing, vice-president, Bradford Corporation, New York, and chairman of the Executive Committee, Railroad Division, 1930.

The first paper presented at the morning session of the Railroad Division was entitled "High-Pressure and High-Temperature Steam for Locomotives" by C. F. Hirshfeld, chief of research, Detroit Edison Company, Detroit, Mich. In introducing his paper, Mr. Hirshfeld stated that his object was to give railroad men the benefit of experience in stationary steam-power-plant practice and not that of telling them what to do in locomotive practice. He considered the advantages of high

pressures and temperatures in stationary practice separately for condensing operation and for back-pressure operation, respectively, and stressed the differences. Included in the paper were his experiences and observations regarding the behavior of metals and boiler circulation under extreme conditions. Mr. Hirshfeld closed his paper with a number of speculations regarding the possible lines of development of steam locomotives.

The second paper presented at the morning session was on "The Stug System of Pulverized-Fuel Firing on Locomotives" by R. Roosen, chief engineer, Henschel & Sohn, A. G., Kassel, Germany. Mr. Roosen's paper was presented by W. H. Winterrowd, vice-president, Lima Locomotive Works, Inc. The object of the Stug system as described in Mr. Roosen's paper is to solve the problem of firing locomotives with coal dust of any description. The author pointed out the advantages that can reasonably be expected from the use of such a system and of some of the difficulties that make the firing of pulverized fuel on locomotives a severe problem. Test results with lignite fuel were included in the paper and the methods and equipment used by the German State Railways were described. Mr. Roosen laid particular emphasis on the economics of the use of pulverized fuel on steam locomotives.

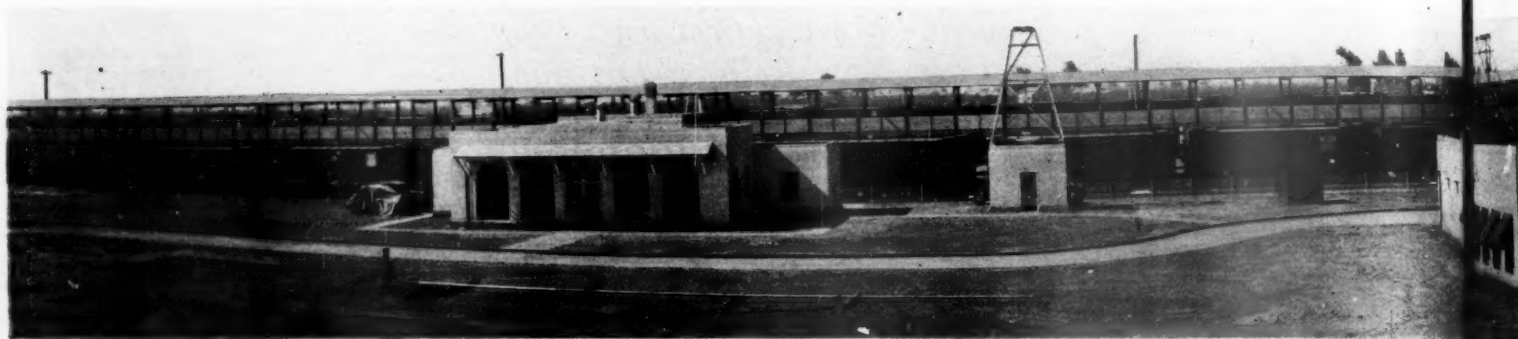
Eliot Sumner, assistant to the general superintendent of motive power, Pennsylvania, and chairman of the Executive Committee, Railroad Division, 1931, Philadelphia, Pa., presided at the afternoon session of the Railroad Division. This session was devoted entirely to the presentation and discussion of a paper by T. H. Symington, president, T. H. Symington & Son, Inc., Baltimore, Md., on Research Relating to the Action of Four-Wheel Freight-Car Trucks. An abstract of Mr. Symington's paper and also of that prepared by Mr. Roosen will appear in later issues of the *Railway Age*.

Vibration of Railway Bridges

In addition to the three papers presented by the Railroad Division, a paper on the "Vibrations of Railway Bridges" by J. N. Goodier, University of Michigan, Ann Arbor, Mich., was contributed by the Applied Mechanics Division. Prof. Goodier's paper contained a discussion of the nature of the approximately resonant vibrations of bridges due to the pulsating forces generated by unbalanced drivers, the influence of the motion of the train and possible action of the springs. He included in his paper a group of proposed approximate formulas for predicting the natural vibration frequencies to be found in bridges, whether unloaded or supporting trains. The author also described methods of measuring natural frequencies, gave a list of the sources of damping and a theoretical demonstration of the effects of a small amount of distributed damping in restraining forced vibration, and an appendix in which the frequency formulas are derived.

New Terminal Speeds Fruit Movement

Large yard of the Southern Pacific and modern icing plant at Fresno incorporate interesting features to expedite car movement



The New Icing Plant, Which Has Storage Space for 40,000 Tons of Ice, Co

THROUGH the efforts of the Southern Pacific and the Pacific Fruit Express Company, Fresno, Cal., which is located in the heart of the fruit-producing area of the San Joaquin valley, has been provided with most modern facilities for the expeditious icing and handling of fruit trains. With ultimate plans for the development of a complete new yard and engine terminal at this point only partially carried out to the present time, the work already completed includes primarily two or three new yard units on an entirely new site, involving about 33 miles of tracks; auxiliary yard facilities, such as a 150-ton track scale, floodlights, water service, a yard office, a storehouse and other minor building units; and a modern icing plant, which is one of the most up-to-date facilities of its kind on the Pacific coast. This latter facility, which has capacity for the manufacture of 600 tons of ice a day, provides for the storage of 40,000 tons of ice and for icing cars at the rate of one a minute.

Replaces Old Terminal

With the extension of irrigation in the San Joaquin valley, Fresno, about 206 miles south of San Francisco, has become the leading fruit distributing point in the valley. This has resulted from the fact that it is near the north end of the fruit-producing area and is the northern terminus of the San Joaquin division; furthermore, it is at the junction point of the two main lines of the Southern Pacific through the valley, and is at the hub of a number of lines radiating into the fruit territory.

Old facilities at Fresno included a complete engine terminal and considerable yard trackage within the city limits, which had become inadequate and incapable of expansion because of the growth of the city. Enlargement of these facilities, therefore, particularly in the way of increased trackage and modern icing equipment to meet the increasing demands being made by the peak movement of perishable produce, required the relocation of the terminal.

Accordingly, an entirely new terminal was planned and laid out about four miles north of the city, on the more easterly of the two valley lines; which leads via Roseville, Cal., the gateway to eastern markets for the larger part of the valley fruit traffic. Work was started early in 1928 and, in the development of the plans, only

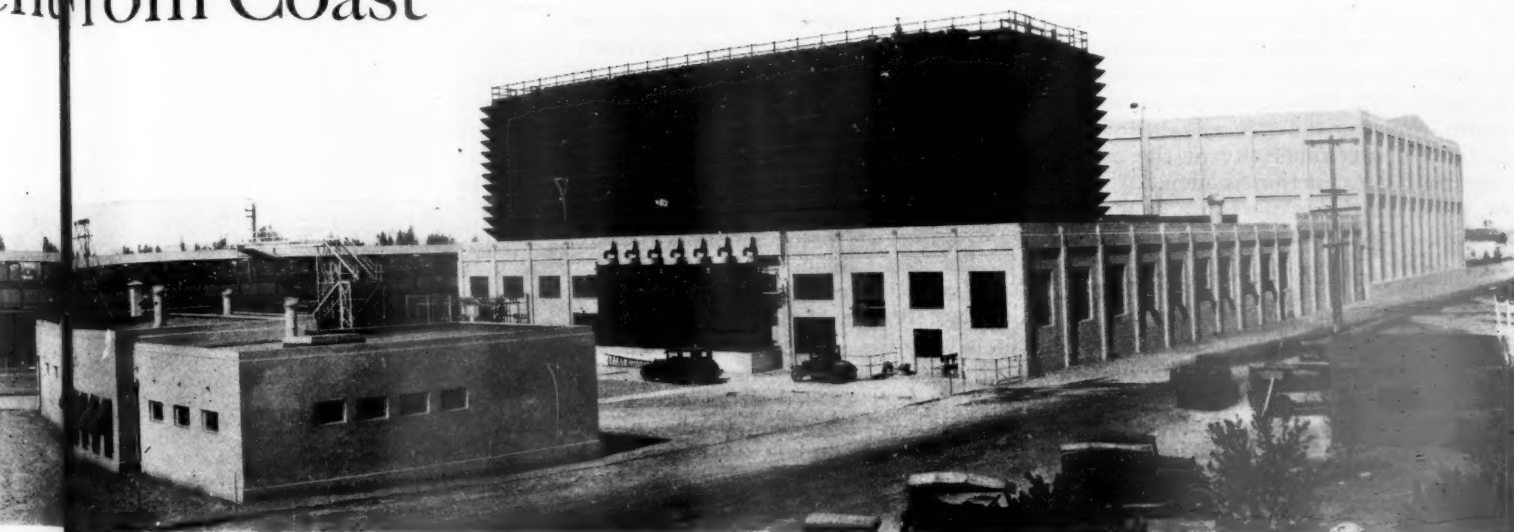
the most urgently needed facilities were constructed at first, these including the first yard unit, containing about 24 miles of tracks, a few car-repair tracks, water and fuel-oil facilities, a yard office, and the icing plant. Subsequently, the second unit of yard tracks, with a few caboose tracks and additional car repair tracks, was constructed, together with a storehouse, a blacksmith shop and several wash and locker buildings. The main engine terminal facilities planned, including two 30-stall engine-houses and a machine shop, together with service tracks, are yet to be undertaken, as is also the third group of yard tracks. For the present, therefore, all locomotives operating in and out of Fresno are handled at the old enginehouse within the city limits.

New Yard is Two Miles Long

The new yard, which extends in a general north and south direction, was laid out on a newly acquired piece of property, 650 ft. wide and 2 miles long, located four miles north of the city. This property was well situated for the terminal, but required extensive grading and the construction of a new paved highway along its east side in order to make possible the vacating of streets and roadways over the yard area. The grading, which for economic reasons was done over the whole area at one time, even though there was no intention of utilizing the property fully for the first few years, amounted to about 239,000 cu. yd. This work, which was done in a most interesting and effective manner, largely by means of caterpillar tractors and large capacity scrapers and two-wheel dump carts, was described in detail in an article entitled "Modern Methods Used in Grading," which appeared in the *Railway Age* for August 23.

The accompanying plan shows the completed yard and engine facilities already at the terminal and, also, those facilities, including additional yard tracks and the two enginehouses, which are to be constructed later as conditions warrant. In the present yard layout, the tracks are grouped largely in units of four to eight tracks, with separate ladders and leads for each unit at both ends to facilitate train movements into and out of the different tracks.

The present yard tracks hold from 50 cars to 121 cars each, and have a total capacity of about 2,100 cars, while the ultimate capacity of the yard, when the third unit of



of Ice, C
Manufacture 600 Tons of Ice a Day and Ice Cars at the Rate of One a Minute

tracks is completed, will be about 2,450 cars. Number 9 switches on No. 7 ladders are used throughout, and the body tracks in the different track groups are spaced on 13-ft. centers. Caboose and repair tracks, with ladders at both ends, are located at the south end of the yard, and have direct connection with the north end of the yard tracks through a running track which skirts the east side of the yard layout. This latter track is also used by light engines moving back and forth between their trains and the enginehouse at Fresno. Further convenience for the movement of these engines is provided through the construction of a second main track south of the yard for a distance of about $2\frac{1}{2}$ miles toward Fresno.

A feature of the yard is the provision for floodlighting throughout in order to permit efficient and safe night operation during seasons of peak traffic. This lighting is accomplished by nine batteries of floodlights mounted on high steel towers at strategic points.

Modern Icing Plant Provided

The most interesting facility at the new terminal at the present time is the car icing plant, which is located about midway the length of the terminal along its east side. This new plant, which is a complete manufacturing and delivery unit and one of the most up-to-date facilities of its kind in the country, consists essentially of large ice manufacturing and storage units and a 75-car length icing platform served by through tracks on both sides. Auxiliary buildings in connection with the plant include a three-section general service building, which houses the plant office, a locker room, a storeroom, a machine shop, a blacksmith shop and a garage; another building, which contains a dining room accommodating 75 men, as well as a kitchen and sleeping quarters for cooks and waiters; and a third building, in three sections, which provides sleeping, and shower and toilet facilities for 50 men.

The main plant, which has a daily production capacity of 600 tons and storage capacity for about 40,000 tons, and which can ice cars at the average rate of one car a minute, is of reinforced concrete construction, with structural steel roof-supporting columns and roof trusses. The building itself, which covers an area 440 ft. long by 158 ft. wide, is divided into four main units, including a compressor or machine room, 48 ft. long, 158 ft. wide

and 20 ft. high; a tank, or freezing room, 113 ft. long by 158 ft. wide and 25 ft. high; a day storage room for the handling of ice to the icing platform as manufactured, which is 79 ft. long by 158 ft. wide by 11 ft. 6 in. high; and a winter storage room, 200 ft. long by 158 ft. wide by 60 ft. high.

Storage Rooms are Well Insulated

From a construction standpoint, the two storage rooms are the most interesting parts of the plant. Both of these rooms are without windows and are practically devoid of columns which would interfere with the storage and handling of ice. For example, the larger storage room, with a floor space of 31,600 sq. ft., has only 12 interior columns.

The matter of insulation was given primary consideration in the design of the storage rooms, particularly because of the intense heat in the valley during the summer, and resulted in providing insulation on all side walls and on the roofs and floors. The floor construction consists of six inches of reinforced concrete, four inches of cork insulation laid in hot asphalt and a four-inch reinforced concrete top wearing course. The exterior walls are insulated with five inches of cork, built up in two layers, and the roofs over the two rooms are of special construction, with a $7\frac{1}{2}$ -in. layer of porous gypsum to provide the insulation desired.

In constructing the side walls, a three-inch layer of cork was first applied as the concrete was poured, by using it as the facing on the inside forms. After the concrete had set, holding the cork in place, the forms were stripped and a second layer of cork, two inches thick, was applied to the first layer with hot asphalt. Completing the work, the interior faces of the walls were mopped with hot asphalt, and later coated with aluminum paint because of the reflecting value of this material in the artificial illumination of the rooms.

The roofs over the storage rooms are of the flat type, supported on structural steel trusses, and consist of a course of one-inch tongue and groove sheathing, on top of which was poured a $7\frac{1}{2}$ -in. course of specially prepared gypsum, which set up with a porous or cellular texture. One-inch sheathing was applied over this insulating course, and the top surface was then protected with 20-year built-up roofing.

The cellular texture of the gypsum in the roof construction was provided by adding aluminum sulphate, with a saponifying agent to the gypsum during mixing, these admixtures causing the liberation of carbon dioxide gas in the presence of the mixing water. This action takes place rapidly, as does also the setting of the gypsum, trapping the gas cells uniformly throughout the material. The conductivity of the cellular gypsum used in the roof construction is about 0.52 B.t.u. per square foot, per inch of thickness, per hour, per degree Fahrenheit difference in temperature.

Modern Ice Manufacturing Facilities

The principal equipment and facilities at the plant for the manufacture of ice includes two deep wells equipped with centrifugal pumps, four compressors, seven condensers, two circulating pumps, two cooling towers for condensing water, a forecooler, four ice tanks with a combined capacity for 5,160 ice cans, special ammonia and brine circulating systems, and suitable elevating and conveying equipment for the handling of the ice to and from storage. All four compressors are located in the compressor room, and include two duplex, two-cylinder, 16-in. by 18-in. units, driven by 500-hp. synchronous motors, which operate on the refrigerating systems in the ice tanks and in the storage rooms; one single-acting, two-cylinder, 16-in. by 18-in. compressor, driven by a 300-hp. synchronous motor, which operates on the forecooler and on a liquid ammonia flash cooler; and a single-acting, two-cylinder, 9-in. by 9-in. unit, driven by a 50-hp. synchronous motor, which is used primarily for line pump-out service, but which can be operated on the main suction line, if desired.

In the freezing room, practically the entire floor area is occupied by four large ice tanks, all above the floor level, each having a capacity for 1,290 ice cans. Each of the tanks is 30 cans wide by 43 cans long, the individual cans being 11 in. wide by 22 in. long, and 51 in. deep, and capable of producing ice blocks with a net weight of 300 lb. The cans are arranged in grids of 10 cans each, which are handled as units to and from the freezing tanks by overhead traveling cranes.

The flooring over the tanks is of two one-inch thicknesses of hardwood, and is divided into removable sections equal in area to the areas occupied by the 10-can grids. Through this type of construction, the entire surface of the refrigerating tanks is kept covered, except directly at the points where grids of ice cans are being lowered into or removed from the tanks. Handling of the floor sections is done by the cranes, without physical effort on the part of the ice plant employees.

The refrigerating system used in the ice tanks is known as the "vertical trunk" system, in which each tank has one large steel bunker containing four sets of trunks, and each trunk has three sets of ammonia coils. The brine circulating system in the tanks is separated for each of the tanks, and each tank has three large vertical agitators, which cause the brine to circulate from the center of the tank toward both ends through the bunker, and to return around and between the cans. This system of circulation results in the minimum of brine travel between the cans and causes a temperature rise in the brine of only $\frac{1}{2}$ deg. F.

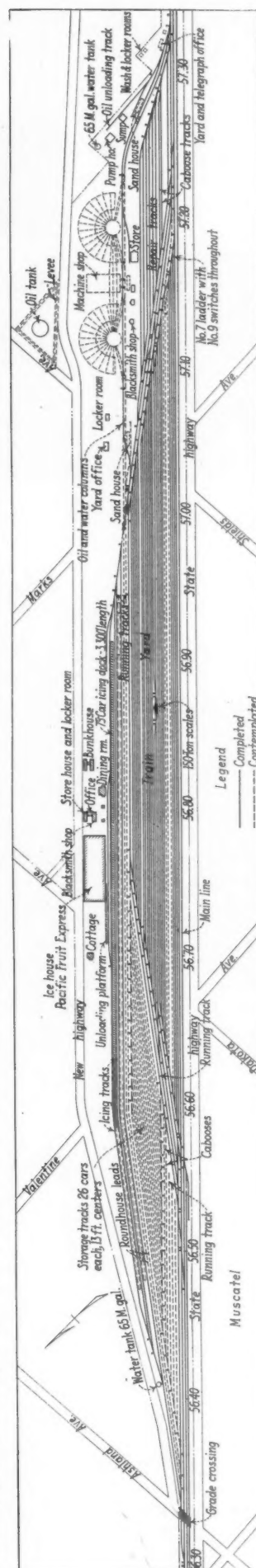
The ice tank design used has two advantages over old style freezing tanks, the first being that the ice cans do not come in contact with the ammonia piping, thereby eliminating the danger of damaging or breaking the ammonia coils if a can or grid of cans should fall into the tank by reason of a broken cable or mechanical failure of the hoisting cranes. The second advantage is that with the coils enclosed in steel bunkers, the brine can be

forced through them at high velocity, which greatly increases the refrigerating efficiency of the tanks.

All water used in the manufacture of ice is secured from the two deep wells at the plant and is put through the forecooler tank before being run into the ice cans. In this tank, which is equipped with submerged ammonia coils, the water is cooled from the average temperature of 70 deg. F. at which it is received, to an average temperature of 36 deg. F.

Unloading of the ice cans is done at ice dumps, where all ten cans in a grid are dumped together and then filled simultaneously by a battery of ten hydrants with one quick-operating valve. When filled, a grid of cans is carried back to its place in the refrigerating tank by the traveling crane serving the tank. The cranes used are provided in each case with a low platform, just clear of the floor, on which the operator rides in a standing position. At the proper place, the grid of cans is lowered into the brine tank, after which the crane hooks are used to pull the section of flooring, belonging over the cans, back into place.

In delivering solid cakes of ice from the tanks to the day or winter storage rooms, the crane moves to a point directly over a grid of cans and, after removing the section of flooring over the grid, reaches down and withdraws the group of ten cans with their solid cakes. The crane is then moved to what is called the ice dump, where the cans are first lowered into a dip tank of tepid water to free the ice cakes. As the cakes free themselves,



General Layout of the Yard and Terminal Facilities at Fresno

they rise in the cans, and when all of the cakes are free, the grid of cans is raised by the crane and set on a hydraulic tipping board. This board dumps the cans forward through an angle of about 100 deg., allowing the ice cakes to slip out and over skidways into the day storage room, or across this room into the winter storage room. With the removal of the ice cakes, the cans are all righted by the tipping board, simultaneously, and are directly in position for refilling with water from the forecooler.

Mechanical Conveyors Handle Ice

All handling of the cake ice into and out of storage is done by mechanical conveyors. The ice can be piled in the main storage room if production exceeds the demand, or can be delivered directly to the icing platform for use. Piling of the ice is done by two double-gig elevators which raise the cakes to the desired level and unload them on to the ice already in storage, while delivery of the ice directly to the icing platform, as received from the cans, is over a chain conveyor across the center of the room. On the track side of the room, the chain conveyor connects with an incline, which, in turn, carries

both of these cases, this is made possible by a ten-car delivery platform along the track side of the building, which is served by two power inclines to the ice bridge, one leading to the bridge from each side. When utilizing ice from the day storage room, the cakes are carried on a chain conveyor to one of the power inclines leading from the car delivery platform, from which point they are elevated to the icing bridge and then moved across to the icing platform. With these different means of handling the ice, the ice cakes can be delivered to the icing platform from three sources at the same time if necessary.

Platform Serves 150 Cars at a Time

The icing platform, which is of the island type, is 14 ft. wide and 3,300 ft. long, providing icing space for 75 cars on each side at the same time. It is of frame construction throughout, except for concrete footings, with its icing deck at a level about one foot above the tops of standard refrigerator cars. The icing deck is supported on side posts, which extend above the deck to support a double-pitched roof throughout the length of the platform. By using this type of construction, the deck is



Looking North Over the North Half of the Yard, Showing Icing Plant and Platform on the Right

the ice to a bridge over two tracks between the building and the icing platform. This bridge, which is at an elevation of 24 ft. above the tracks, conveys the ice cakes to a point directly over the center of the icing platform, at the level of its roof, from which point a retarding conveyor lowers it vertically to the deck of the platform.

When drawing on stored ice in the winter storage room for icing requirements, the cakes are moved to the icing bridge from the elevation at which they are stored, whether below or above the elevation of the bridge, over either of two boom conveyors, with power chain drives. These conveyors are pivoted at their ends near the bridge, and their opposite ends can be raised or lowered, according to the level of the ice in storage, by means of electric winches. The combined handling capacity of the two boom conveyors is about three tons of ice a minute.

In addition to the facilities for delivering ice to the icing platform from the winter storage room, delivery can also be made from the day storage room, or, in cases of emergency, if it is necessary to bring in ice from an outside source, the ice can be handled directly to the icing platform from the cars in which it is received. In

unobstructed, providing a clear space through its center for the ice conveyor.

A feature of the icing platform is the provision along its sides of aprons three feet wide, which are hinged to the icing deck and held in a horizontal position during icing operations by means of chains attached to the roof-supporting posts. When not utilizing a particular part of the platform, or when icing on one side only, the aprons not in use are pulled up to form an enclosure for the icing deck, thereby making it safer for the men at work. While in their lowered positions, the aprons extend out to the face of the inside ice bunkers of the cars, and thereby greatly facilitate the icing operations. When initially icing cars, about two-thirds of the ice required can be delivered from the aprons into the car bunkers without the use of an icing board. The aprons also eliminate the dropping of ice between the platform and the cars and serve to protect men walking back and forth between the platform and the cars.

The ice is delivered to the icing deck at the middle point of its length, so that it can be run with equal facility and speed toward either end of the platform, or to both ends at the same time. The ice conveyor on the



Icing Cars with Safety from the Side Aprons of the Platform—Note Aprons Drawn Up Along the Left Side of the Platform

platform is of the link chain type, driven by an electric motor through herringbone gear reduction units. Automatic take-ups, by means of counterweights, are provided in the chain conveyor in order to keep uniform tension on the chain at all times, regardless of the load carried or the temperature. These were provided principally because of the wide variation in the daily temperature at Fresno during certain seasons, which not infrequently falls as much as 50 deg. F. from midday to midnight, and, furthermore, because of the unreliability of depending upon the workmen to make the proper adjustments with hand screw take-ups. Fifty degrees change in temperature causes the conveyor chain to expand or contract about seven inches, which would have a decidedly detrimental effect upon the conveyor and its operation if not carefully compensated for.

With the facilities provided, 150 cars can be iced at one time, 75 on each side of the platform, at an average rate of a car a minute, and, owing to the length of the icing tracks, trains are not broken up for the icing operations. During the fruit season of 1928-1929, the car movement through Fresno yard ranged from 33,286 cars in February, to over 59,000 cars in September and in October, with a peak daily movement of 2,568 cars in 1928 and 3,081 cars in 1929. The average number of cars iced daily during the fruit movement in September and October, 1929, was 385, with a peak daily icing of

723 cars. During the peak seasons, from 125 to 150 men are employed to operate the plant and to ice cars, while during the remainder of the year, from 20 to 25 men are sufficient to handle the work. Practically all of these men are boarded and lodged in quarters provided at the plant to insure that a sufficient number of men will be on hand to meet any condition which may arise.

Construction Work Progressed Rapidly

One of the outstanding features in connection with the new facilities at Fresno was the speed with which the work was done. In the first place, the entire yard area was graded in 90 days, 30 days less than the limit specified in the contract. Work on the first unit of yard tracks and the icing plant was then pushed and, after 150 days, most of the tracks were in service and the first compressors at the plant were put in operation. Thirty days later the facilities were formally opened and were in full operation.

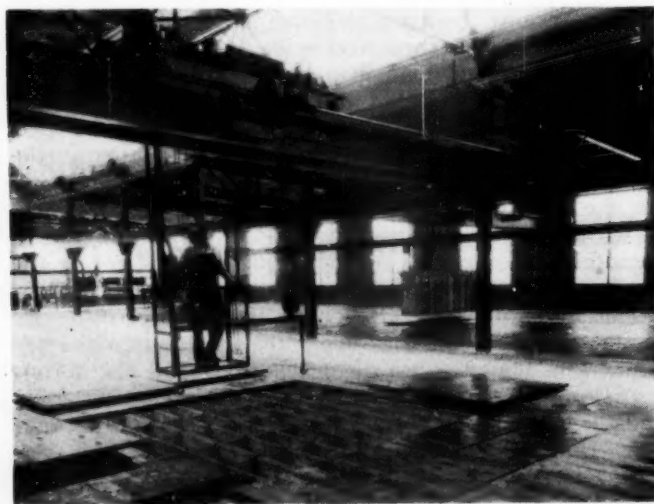
All of the yard and engine terminal facilities at Fresno were constructed by the Southern Pacific, under the direction of W. H. Kirkbride, engineer maintenance of way and structures, while the icing plant was planned and constructed under the direction and supervision of H. T. Whyte, assistant general manager of the Pacific Fruit Express Company, which company operates the icing facilities.

Motor Transport Hearing Moves to Atlanta, Ga.

CONTINUING its investigation in Docket 23,400, Coordination of Motor Transportation, the Interstate Commerce Commission held a hearing in Atlanta, Ga., on December 8. Examiner Leo J. Flynn presided at the hearing, and he was assisted by Examiner Albert E. Stephan. Representatives of several southeastern roads appeared to testify concerning the effect upon their rail traffic of motor vehicle competition, and their own use of motor coaches and trucks.

The first witness for the Central of Georgia, S. L. Peer, statistician on the staff of the vice-president and general manager, described in detail the history and extent of operations of the Central of Georgia Motor Transport Company of which he is secretary. Combination motor coaches, having compartments for handling a substantial quantity of mail, baggage and express, are operated by the motor transport company, he said, in replacement of several branch line trains, while trucks are being used in the Birmingham district to replace two freight trains and to improve the freight service. These trucks move only from station to station and do not render store-door service, he testified. Examiner Flynn asked why store-door service was not rendered, but the witness was not qualified to answer this question.

W. B. McKinstry, controller of the Central of Georgia, and auditor of the motor transport subsidiary, testified as to the results of the motor transport company's operations. The motor transport company, he said, has operated at a net loss of \$28,449, of which \$15,232 was incurred during the first ten months of this year. The Central of Georgia, he said, has advanced \$67,000 to the motor transport company for the purchase of equipment and for other purposes. In reply to a question, he stated that this sum is shown on the books of the railway as an "advance to a subsidiary."



A Section of the Freezing Room, Showing Arrangement of Freezing Tanks

Depreciation on the motor vehicle equipment, Mr. McKinstry said, is figured at 20 per cent per year, while a maintenance reserve of six cents a mile is set aside for motor coach maintenance and five cents a mile for motor truck maintenance. In addition, there is a tire reserve of 1½ cents per mile.

Highway Subsidiary Reduces Operating Expenses for the Central of Georgia

As a result of its subsidiary's operations, Mr. McKinstry testified, the Central of Georgia has been able to save \$7,038 a year from the replacement of passenger train service between Fort Valley, Ga., and Perry; \$10,004 a year from the replacement of passenger train service between Opelika, Ala., and Roanoke; \$6,758 a year from the replacement of passenger train service between Eufaula, Ala., and Ozark; and \$4,135 a year from the replacement of passenger train service between Cuthbert, Ga., and Fort Gaines. The trucks operating in the Birmingham district, he continued, are enabling the railway to save \$20,000 a year in train operating expenses, as well as \$11,940 a year in per diem on freight cars.

Examiner Flynn asked Mr. McKinstry for his conclusions as to the advisability of a railroad's substituting motor vehicle service for train service. Such substitutions, said the witness, can be effected advantageously on lines having light traffic. Public opinion, he concluded, is an important factor to consider in planning replacement of train service.

Motor coach competition and the motor coach operating methods of the Central of Georgia were described by John W. Blount, general passenger agent of the railway and its subsidiary. The motor coach fare on the railway-operated vehicles is the same as the rail fare, he said. Railway agents sell both kinds of tickets, and the same stations are used. Revenues from the sale of motor transport company tickets are reported to the railway by the agents, and are credited to the motor transport company's accounts. A passenger holding a ticket reading via the Central of Georgia may ride part way by train and part way by motor coach. Baggage is handled in the motor coach if possible, but occasionally heavy pieces are forwarded by freight train, there being no payment to the railway by the motor transport company for this service.

The Central of Georgia's passenger revenues have declined 49 per cent since 1920, said Mr. Blount. Sixty-two motor coach lines are operating under certificates in Georgia, he said, and 36 of these compete with the Central of Georgia. Between Atlanta and Macon, for example, two motor coach companies offer 11 schedules in each direction daily, charging a fare of \$2 while the rail fare is \$3.17. He compared railway and motor coach fares between a number of other points, such as Atlanta and Jacksonville, Fla., the rail fare being \$12.23 and the motor coach fare \$7.50.

The railways are losing long-haul as well as short-haul traffic to the motor coach lines, said Mr. Blount. The motor coaches are not much slower than the railways' fastest trains between a number of important points in the southeast. As an example, he mentioned the service between Atlanta and Jacksonville, where the motor coaches make almost as fast time as the overnight trains between these cities.

Questioned by Examiner Flynn as to the attitude of the public toward the substitution of motor vehicle service for train service, Mr. Blount said that in every instance a proposal to remove train service in favor of

motor coach service is resisted by the public, which wants its trains for sentimental if for no other reasons. The Central of Georgia has had no complaints concerning its motor coach services since they have been established, he added.

Highway Freight Traffic in Georgia and Alabama

W. McN. Knapp, freight traffic manager of the Central of Georgia, testified that a large volume of freight traffic is now moving by truck in Georgia and Alabama, for distances up to 400 miles. There are over a hundred fixed-route, certificated lines in Georgia and nearly two hundred certificated lines which do not operate over fixed routes, he said, but there are many more which have no certificates at all. Both contract and common carrier haulers are able to secure certificates without difficulty, said Mr. Knapp, and the contract haulers so certificated can operate as they please anywhere in the state. Trucks were taking a large amount of cotton from the railways until the latter reduced their rates and thus held this business, he said. Questioned by the examiner, Mr. Knapp said that the Central of Georgia has not offered store-door service as yet, since it feels that such service should be offered at all points on the railway if at any one point. It does not own sufficient equipment to establish such service at all points, he said.

B. H. Lord, general manager of the Louisville & Wadley, the Wadley Southern, the Wrightsville & Tennille and their joint subsidiary, the Short Lines Motor Transport Company, testified that the Wadley Southern has abandoned 60 miles of line, partly because of the decline of the lumber industries served but also because of motor vehicle competition. The motor transport subsidiary, he said, operates a combination passenger and express motor coach between Wadley and Louisville and between Wadley and Stillman, replacing train service the withdrawal of which saves the Louisville & Wadley \$20 a day and the Wadley Southern \$30 a day. The annual railway savings resulting from the motor coach operation were estimated at approximately \$12,500.

The passenger traffic of the Wrightsville & Tennille has virtually disappeared, Mr. Lord said, while contract truck competition has greatly reduced the merchandise traffic. The railway reduced its rates on cotton as much as fifty per cent to meet truck competition, he said, and this action brought back much of the traffic to the rails. Although some truck operators reduced their rates in turn, they were not particularly successful in holding the cotton traffic, Mr. Lord said, shippers preferring railway service at the reduced rates on account of the reconsignment privilege, the bankability of bills of lading, and the reduced loss and damage.

Mr. Lord told of a conversation with a shipper concerning the possibility of the railways offering store-door service. This shipper, said Mr. Lord, was of the opinion that store-door service offered by the railway would bring about a return of merchandise traffic to it only if the store-door service were available at all points in the vicinity. If a shipper must operate his own trucks or use truck service to some points in order to have store-door delivery there, he might as well use the same trucks to send shipments to intermediate points as well, since the trucks are going through those points anyhow.

N. B. Wright, traffic manager of the Central of Georgia, testified concerning the reduced rail rates on cotton. These reduced rates recovered the lost traffic, he said, and the volume of business handled at the low rates was more than sufficient to pay the cost of furnish-

ing the service. He pointed out that the retention of the cotton traffic also means the retention of a certain amount of merchandise traffic which the cotton-carrying trucks customarily carry to make up return loads.

T. M. Cunningham, vice-president and general counsel of the Central of Georgia, cited statistics to show that motor transportation is not sound economically since its costs do not include an adequate charge for the use of the highways. Of the various kinds of truck operators, said Mr. Cunningham, those who cut most deeply into railway revenues are contract haulers and private haulers. He referred to a decision of the Georgia Supreme Court which held that the state can regulate the business and charges of even private truck operators since they are doing business on highways which are state-owned. Regulation is not effective unless all those doing business on the highways are regulated, he contended. Many private carriers he pointed out, are handling more tonnage than common carrier truckers.

The worst feature of the situation is the non-enforcement of the existing law, said Mr. Cunningham. Georgia has only four inspectors and one attorney to enforce its motor vehicle law, he said. There is no police system on the highways, and rates are fixed by the operators and not by the commission. Furthermore, he said, the state is not getting the full amount of the taxes due it from motor carriers. Congress, Mr. Cunningham concluded, should enact legislation to regulate all motor coach and truck operations, whether common carrier, contract or private.

J. D. Bradley, president of the Collins & Glennville, I. R. White, superintendent of transportation of the Georgia & Florida, and other representatives of short line railways, testified concerning their loss of traffic to motor vehicle lines, particularly the uncertificated lines which far outnumber the lines operating under state-granted permits. This concluded the railway testimony.

Operations of Truck Companies

Two representatives of motor truck operating companies took the stand to describe their services. One testified that his company operates in North Carolina and South Carolina as a common carrier under certificates granted by the state commissions. Its rates, he said, are 25 per cent more than rail rates on all commodities except cotton piece goods, on which the truck rate equals the rail rate. The truck rates, he said, include a charge of eight cents a hundred pounds for the store-door collection and delivery. This company, he said, has secured its present volume of traffic, not by cutting rates, but by rendering a better service.

The other truck operator testified along similar lines, stating that his company operates 14 trucks and 7 trailers in intra-state service in Georgia. It has developed its traffic, he said, on a basis of better service, and at rates in some instances higher than rail rates. He mentioned the fact that 60 per cent of the traffic handled by his company is picked up by the trucks after railroad freight houses are closed.

The final witness was the traffic manager of the Coca Cola Company, who said that store-door service is essential. The railroads can hold their traffic if they provide store-door service, he said, but it will go to truck lines offering collection and delivery if the railroads fail to do so.

The Atlanta hearing followed a hearing in New Orleans, La., on December 3, at which no railways appeared to testify. The hearing at Atlanta adjourned on December 8, to continue at Detroit, Mich., on December 11.

Freight Car Loading

WASHINGTON, D. C.

REVENUE freight car loading in the week ended November 29, which included the Thanksgiving Day holiday, amounted to 702,085 cars, a decrease of 134,225 cars as compared with that of the corresponding week of last year and of 198,471 cars as compared with 1928. The reduction as compared with 1928 was 22 per cent, whereas in the previous week the loading was about 24 per cent less than in 1928. All classes of commodities and all districts showed reductions as compared with both years, the heaviest decreases being shown in the loading of coal and merchandise and miscellaneous freight. The summary, as compiled by the Car Service Division of the American Railway Association, follows:

Revenue Freight Car Loading

	Week Ended Saturday, November 29, 1930		
Districts	1930	1929	1928
Eastern	154,714	186,904	198,929
Allegheny	133,380	170,669	183,539
Pocahontas	43,493	51,874	54,224
Southern	112,274	123,810	138,832
Northwestern	79,090	99,808	105,649
Central Western	114,941	136,323	139,747
Southwestern	64,193	72,922	79,636
Total Western Districts	258,224	309,053	325,032
Total All Roads	702,085	836,310	900,556
Commodities			
Grain and Grain Products	33,730	38,716	53,591
Live Stock	23,821	25,769	25,623
Coal	147,989	176,908	179,122
Coke	7,774	11,427	10,210
Forest Products	32,095	48,611	58,448
Ore	5,773	9,438	11,183
Mdse. L. C. L.	194,952	220,000	226,169
Miscellaneous	225,951	305,441	336,210
November 29	702,085	836,310	900,556
November 22	779,737	949,716	1,029,237
November 15	829,251	982,926	1,056,120
November 8	881,401	1,048,968	1,054,353
November 1	934,640	1,072,234	1,103,942
Cumulative totals, 48 weeks	43,103,568	49,489,591	48,072,852

The freight car surplus for the period ended November 22 averaged 533,445 cars, an increase of 63,652 cars as compared with the preceding week. The total included 284,345 surplus box cars, 190,937 coal cars, 26,282 stock cars, and 9,289 refrigerator cars.

Car Loading in Canada

Revenue car loadings at stations in Canada for the week ended November 29 totaled 55,384 cars, a decrease from the previous week of 5,224 cars and a decrease of 6,029 cars from the same week last year.

	Total Cars Loaded	Total Cars Rec'd from Connections
Total for Canada		
November 29, 1930	55,384	28,080
November 22, 1930	60,608	31,613
November 15, 1930	58,136	30,954
November 30, 1929	61,413	33,562
Cumulative Totals for Canada		
November 29, 1930	2,957,778	1,594,030
November 30, 1929	3,310,856	1,960,191
December 1, 1928	3,442,928	1,895,760

THE RAILROAD SCRAP PILE.—The public should be concerned about the condition of the railroads, from a selfish point of view if for no other reason. Railway service cannot be taken for granted. In the past ten years, in the State of Georgia alone, 16 short lines have been abandoned and dismantled, and the process is still going on. The total mileage discontinued in Georgia since 1921 reaches the astonishing total of 597 miles. Sufficient patronage by the public would have saved this mileage from the scrap pile. If the public desires and needs railway service it should support the railroads, at least to the extent of insisting that their competitors be allowed to compete with them only on a fair basis of regulation, supervision and taxation.—*Central of Georgia Advertisement.*

Penna. Control of Wabash and L. V. Disapproved

*Ordered by I. C. C. to divest itself of stock holdings in
two companies—Penna. to seek court review*

WASHINGTON, D. C.

THE Interstate Commerce Commission on December 6 made public its order, dated December 2 directing the Pennsylvania Railroad and the Pennsylvania Company to divest themselves within six months of all stock of the Lehigh Valley and the Wabash to some one in no way connected with or under the control or influence of the Pennsylvania. The order was based on a finding that the two companies had violated the Clayton anti-trust act by the acquisition of stock of the two companies in 1927 and 1928, about 48 per cent of that of the Wabash and about 49 per cent of that of the Lehigh Valley, including stock held by the Wabash as well as that held by the Pennsylvania Company, Commissioner Aitchison dissented.

This decision is supposed to be a step toward the possible formation of a fifth eastern system built around the Wabash and Lehigh Valley, as outlined by the commission in its consolidation plan, but which the commission said could be approved only on the basis of complete independence of any other system. The Pennsylvania, however, will contest the order in the courts on the ground that its acquisitions of the stock of those two roads does not come within the prohibitions of the Clayton law.

Three controlling issues were presented in the case, the commission said in its report. As to the first it held that "the fact that the corporate machinery of the Pennsylvania Company was used in financing these purchases of stock and in taking title thereto does not obscure the fact that all of these transactions were directly and solely in the interest of the parent company, the Pennsylvania Railroad."

As to the second issue, as to whether the effect of the acquisitions may be to substantially lessen competition between the Pennsylvania and either or both of the other roads or to restrain commerce, the commission said:

Assuming, though not admitting, that respondents have legal ground for their contention that the law requires the showing of probability of substantial lessening of competition, the record seems ample to meet the additional test. As already stated, the president of the company testified that in acquiring the stocks there was no thought of suppressing competition, and it is urged by respondents upon the evidence of their witnesses that no steps have been taken as the result of the stock acquisitions to change the previous practices in the solicitation of traffic for the respective lines. It was in fact testified that if there has been any change it has been in the direction of increased effort on the part of the respective companies to secure traffic during recent months. Presumably, however, this intensity of effort is due to the general decrease in available traffic rather than to any change in policy. It is obvious that the ultimate effects of the acquisition of control through stock are not to be judged by immediate developments. According to the testimony of respondents' principal witness, the predominant purpose of the Pennsylvania Railroad in acquiring the stocks of the Lehigh Valley and the Wabash was to secure such influence in the management of those companies as to insure their co-operation, if not the actual use of their facilities, in improving the routes of the Pennsylvania Railroad between certain important gateways, particularly New York, Buf-

falo, Chicago and St. Louis. According to the record, nearly one-half of the outstanding stock of both the Lehigh Valley and the Wabash is now held by the Pennsylvania Company or under its control. Exhibits from annual reports to us show that, apart from these holdings, the stocks of both companies are widely scattered. Reports of stockholders' meetings of the Lehigh Valley and the Wabash held during the past five years show that the present holdings of the Pennsylvania interests would in every case have constituted more, and in some cases much more, than 50 per cent of the total stock voted at those meetings.

The third issue was as to whether the acquisitions of stock were within the exception in the Clayton law applicable to corporations purchasing stock "solely for investment." On this point the report says in part:

Respondents take the position, in effect, that as the acquisitions of stocks were an *investment* and as it has not been shown that the stocks acquired have been used by voting or otherwise in the substantial lessening of competition, the purchases fall within the exception. As we have already seen, section 7 as originally proposed and framed apparently contemplated the determination by an administrative body of the actual effect of the acquisition of stock of a competing corporation in testing the question as to whether the acquisition was in violation of the law. After full discussion of this proposal in Congress the idea was rejected as impracticable, and in lieu thereof the section was so amended as to require that in order to establish a violation of the Act it was necessary to show only that an acquisition gave the power to substantially lessen competition. The construction of the third paragraph now insisted upon by respondents would be wholly out of harmony with the controlling provisions of the section as it now stands; and the fact that this paragraph was not amended at the time is evidence that Congress deemed such amendment unnecessary. The reasonable construction of the language of the third paragraph fully sustains this hypothesis. It is noted that following the words "solely for investment," which apparently expressed the predominant thought of Congress, the conjunctive *and* was used, followed by the explanatory specification, "not using the same by voting or otherwise to bring about, or in attempting to bring about, the substantial lessening of competition." That the description "solely for investment" was deemed controlling is indicated by the reference to this provision in the committee reports and debates in Congress.

The construction contended for by respondents would require us to subordinate the expression "solely for investment" to the remainder of the sentence or to ignore it entirely. What Congress had in mind in including the exception in the act as passed is clearly indicated by the reports of the debate. It had been proposed to eliminate the paragraph entirely, but it was pointed out that many corporations, such as savings banks, etc., invest in the securities of public utility corporations, some of which may be in competition, and this consideration apparently prevailed.

The success of respondents' contention would have the result of practically nullifying the section as a whole, since it would be exceedingly difficult to establish by proof that competition had been substantially lessened by reason of specific acts in the use of stocks.

The purchases of Lehigh Valley and Wabash stocks by the Pennsylvania gave no indication of direct financial profit at the time the purchases were made. Computations made by our Bureau of Inquiry and presented in its brief, the correctness of which has not been questioned by respondents, indicate that up to April 30, 1930, the cost to the Pennsylvania in interest paid and in interest lost on securities sold to finance the purchases amounted to about \$9,072,006.25, which exceeds by \$2,590,694.29 the amount of the dividends received on the stock acquired. It should be noted that the common stock of the Wabash ac-

quired by the Pennsylvania, amounting to \$36,290,000, par value, had never paid a dividend. We find that the purchases of stock here in question were not made solely for investment, within the meaning of the Clayton Act.

According to the testimony of the president of the Pennsylvania corporations, the principal purpose of the acquisitions of the Lehigh Valley and Wabash stocks was to secure interests in important lines needed by the Pennsylvania Railroad to round out its transportation system,—the same properties being under consideration for other disposition in developing transportation systems in eastern territory. However we are unable to attach weight to this fact. Whether the purchases were made primarily for the suppression of competition or whether that effect would follow merely as an incident to the accomplishment of the larger purpose is a question which we have no right to consider in applying the law to the facts. While it is true that the transportation act, 1920, marked a substantial departure from previous Governmental policy in the matter of competition between railroad companies, we are unable to close our eyes to the fact that Congress required that in the administration of that act competition should be preserved as fully as possible, and to that end it left the Clayton Act in full force and effect, providing, however, in section 5 (8) of the Interstate Commerce Act, that its operation might be suspended by us in order to authorize acquisitions of control of one carrier by another where, in our judgment, such acquisition would be in the public interest. The respondents, in full knowledge of these provisions, have proceeded without coming to us for such authority.

The motion in behalf of the Pennsylvania Company to dismiss the complaint as to that respondent for want of jurisdiction will be denied. Although it is clear that the Pennsylvania Company acted solely in behalf of the Pennsylvania Railroad in these transactions, and that the two corporations together constituted but a single party in interest, we assume that the former holds legal title, as a corporation, to the acquired stocks, and must, as a separate legal entity, take part in the divestment which we shall order. That these acquisitions of stock are within the intended prohibitions of the law we have no doubt.

Pennsylvania to Ask Court Review

The statement of General W. W. Atterbury, president of the Pennsylvania, of that company's decision to seek a court review of the case, follows:

The decision of the Interstate Commerce Commission requiring the Pennsylvania Railroad Company and the Pennsylvania Company to dispose of the stock of the Lehigh Valley Railroad and the Wabash Railway acquired by the Pennsylvania Company was not unexpected, as it follows two prior decisions of the Interstate Commerce Commission made in connection with acquisitions by other companies of the stock of the Wheeling & Lake Erie and the Western Maryland Railway.

Those two prior decisions were not reviewed by the court so that the views upon which the Commission proceeded in those cases and upon which it proceeds in the case against the Pennsylvania have never received judicial approval. Since they are believed to be in conflict with rulings of the Supreme Court of the United States and since they involve what seems an untenable conception of the Clayton Anti-Trust Act, proper steps will be taken in due course to secure a judicial review of the present decision.

Blow-Off Muffler of Improved Design

A BLOW-OFF muffler which is a radical departure from previous types has recently been developed by the Bird-Archer Company, and is being tested on a Chicago & North Western switching locomotive in the Chicago district. The B-A muffler, as it is called, is made in the form of a separator, mounted on top of the boiler, and connected by suitable piping to the blow-off cocks. The separation of the steam and sludge-filled water is accomplished by the application of the centrifugal principle. The blow-down enters the cylin-



Centrifugal-Type Muffler Which Is Located on Top of the Boiler

drical muffler tangentially. The water is thrown to the outside, draining off by gravity through a discharge pipe and being delivered to the ash pan and thence to the track. The steam is discharged vertically into the air much like the discharge of the pops, except that there is much less noise.

Advantages claimed for the new B-A muffler design include satisfactory disposition of the blow-down with safety to all concerned; steam disposed of in such a manner as to cause no obstruction to the engineman's vision; absence of equipment or parts likely to clog up; delivery of sludge-filled water to the track without disturbance of the ballast or trouble due to blowing cinders or sand to the journals; consequent possibility of blowing off the boiler at any time needed, regardless of wind direction or wayside conditions.



Bird-Archer Blow-Off Muffler Applied for Test Purposes to a Chicago & North Western Switcher

I. C. C. Probes Reciprocity in New York Hearings

More New Haven testimony produced—Lehigh Valley, Erie and Delaware, Lackawanna & Western questioned

THE Interstate Commerce Commission's investigation of reciprocity in traffic and purchases on the New York, New Haven & Hartford was unexpectedly halted at New Haven on December 3 in the absence of important witnesses and to give other officers time to develop further data sought by the examiners. The hearing reopened this week at New York where conditions on the Lehigh Valley, Erie and Delaware, Lackawanna & Western were probed. The Lehigh Valley and Erie were also questioned about their dealings with the Chicago packers and more evidence was collected regarding icing contracts.

New Haven Letters

Much of the correspondence in the New Haven's record required no discussion beyond that developed at New Haven and reported in last week's *Railway Age*. The record was replete with instances of traffic embargoes and boycotts by large and small firms disappointed in purchases. It also showed the growth of reciprocity as a policy of the road, under which the purchasing department, at the instance of the traffic department or upon its own initiative, engaged vigorously in trading purchases for the competitive traffic of off-line firms, in many cases withdrawing purchases from concerns which refused to report their traffic to the purchasing department. It also showed the extent to which the purchasing department demanded the shipment of materials in New Haven equipment, prevailed on the beneficiaries of orders to buy supplies from patrons of the New Haven and bargained on behalf of the Pennsylvania as well as itself for the traffic that bidders indirectly controlled or could influence.

Shippers Boycott New Haven

In 1925 the General Electric Company declared an embargo on shipments over the New Haven for the alleged "unfair and unfriendly" attitude of the road in regard to its purchasing. The controversy revolved around the purchasing of electrical equipment. The latter organized a fleet of motor trucks in 1926 to handle certain shipments to and from its plants in New England. The late E. J. Pearson, then president, upheld the action of the road, saying in part: "If complaint is to be made, it seems to be more justifiable on the part of the New Haven." The late N. M. Rice, vice-president of purchases, conferred with the company and the embargo was lifted on General Electric's shipments. Subsequently the Allegheny Steel Company was instructed to swing the bulk of its shipments in New Haven territory back to that road.

Subsequently the road began to get reports on the electric firms' tonnage and it was understood from the testimony of C. E. Smith, present vice-president of the road, that it was the desire to bring about a more favorable relation between the relative traffic from, and the purchases from, the leading electrical firms which

dominated in the recent purchase from the General Electric Company of certain traction equipment.

Later on, the pressure was somewhat reversed when in line with his slogan "Reciprocity is the watchword", Mr. Rice requested the electric company to report its competitive tonnage. G. P. Baldwin, vice-president of the electric company, strenuously objected, saying, "I have in mind where this would lead us if all railroads requested such information. It would require an unconscionable amount of time and detail and a considerable expense." Subsequently the road began to get reports on competitive tonnage and purchases were increased.

In 1926 the Sherwin-Williams Company was "withholding all possible competitive tonnage from the New Haven" because the road was not purchasing "sufficient quantities" of paint from it and was determined to adhere to the "penalizing policy" of several years' duration until it got paint orders. Mr. Rice wrote that the company always got bids and failed to secure more orders because its quotations were excessive. The paint purchases increased from \$900 in 1928 to \$4,732 in 1929. In April, 1929, the company was "much pleased" and the "gate was unlocked", and Sherwin-Williams continued to figure prominently in the division of paint purchases, as reflected by the correspondence.

Autos for Paint Orders

In 1928 the traffic department failed to get competitive automobile tonnage from Willys-Overland Company and appealed to the purchasing department with the announcement of the auto maker that the road was not buying supplies from the Mountain Varnish & Color Works, a subsidiary. There were over a hundred letters in the record on that subject. The purchasing agent told the traffic department that the prices quoted by L. M. Shine, president of the varnish company, were always too high and told him how much they were too high. The traffic department divulged the figures to Mr. Shine, much to the astonishment of the purchasing agent, under the buying policy at that time. The next bid was right, purchase orders were placed for front end paint and automobile traffic was forthcoming. Subsequently the testing department reported that the paint was "peeling off after a short time, necessitating additional painting," and it was given a "blank rating", but in 1929 other purchases were made including a large order for car lacquer regarding which the traffic agent was instructed to see the traffic manager of the Willys-Overland Company and tell him "orally" that the allotment was made at the instance of the traffic department of the road "in hope that it would mean increased competitive traffic."

The paint company got over \$5,000 worth of orders during 1929 but the traffic department was not satisfied with the traffic, finding that it was largely non-competitive business.

The Anthony Carlin Company, makers of rivets; The

American Pulley Company; the Certain-teed Products Company, a dealer in roofing products; the Youngstown Sheet & Tube Company, and the Worthington Pump & Machinery Co., also routed against the New Haven for want of purchase orders, while, in connection with the negotiations for rubber tires for the motor vehicles operated by subsidiaries of the New Haven, for the year 1930, it was brought out that the Fisk Rubber Company had been routing against the New Haven in protest for the road's splitting of orders with off-line firms.

In a long letter the traffic manager of the tire maker said: "We should never favor the payment of a premium by our railroads when making purchases in order to keep New England industry prosperous", but, "it must be evident to all that the prosperity of the New England railroads depends upon the prosperity of New England industries." He deplored that the "largest of our industries should place 88 per cent of its purchases for a particular article outside of New England when, from the standpoint of product, price and service, its needs can be served as well, if not better, at home."

Steel Policies

In March, 1927, B. Campbell, vice-president of traffic of the New Haven, received a letter from J. A. Farrell, president of the United States Steel Corporation, in which the latter said in part:

In looking over our transactions with various railroad companies today, we find that our sales to your company amounted to \$170,502 in the year 1925 and \$142,757 in the year 1926. Our records also show the amounts of freight paid your company for the years 1925 and 1926 as \$1,126,982 and \$1,133,101, respectively.

You are in a better position than we to determine whether we secure an equitable share of your business; although it appears to us that our competitors are securing a larger share than our own companies.

Aside from our shipments of finished products by your lines, a large tonnage of raw materials, etc., are shipped to our plants by companies from which we purchase.

Orders Increased

The letters showed that shortly after this letter Mr. Rice conferred with Mr. Farrell, and at the former's request an arrangement was made to have one office handle negotiations of the Corporation and all its subsidiaries with the New Haven for purchases. It was not brought out whether the plan then evolved by Mr. Rice "to take Birmingham rail from the steel company if they can find a way to move it by the Warrior River Service and their own steamers from the Gulf to a suitable port on the New Haven", was carried out but the road found ways of increasing purchases from the corporation, and Mr. Farrell wrote again in July, 1927, saying in part "We shall do the best we can to merit a continuance of your orders and endeavor to reciprocate in tonnage moved over your lines." It was explained that the road had been purchasing for the most part from the Bethlehem Steel Company in view of the shorter freight haul.

In March, 1928, after placing orders with the American Bridge Company for structural steel and the first order for track spikes "in seven years" with the Carnegie Steel Company, both subsidiaries of the corporation. Mr. Rice wrote to the American Bridge Company requesting that it contract for a large portion of that company's fuel oil requirements from a designated concern whose location "would assure the New Haven's getting the haul." Also, in January, 1929, the new vice-president of purchasing, C. E. Smith, at the request of the traffic department, wrote to the corporation's manager of sales at Boston regarding coal purchased from the Pennsylvania Coal & Coke Co. for the American Steel

& Wire Company, and succeeded in securing a portion of that traffic for the New Haven "in view of our present relations."

Routing Orders

During his testimony, C. E. Smith deplored the thought of denying the shipper the right to route his traffic and the examiner asked if that was not already being done by the New Haven. Several letters were introduced on the subject. In a letter to B. Campbell, Mr. Rice said: "If you will remember we had threatened to take the business away from the Bethlehem Steel Company at one time, in order to get them to route our rail shipments over the Pennsylvania".

New Haven Coal Letters

There were over 1000 letters produced in the hearings regarding coal buying on the New Haven. Most of them dealt with the interest of the Pennsylvania in the purchase and movement of the New Haven's coal. Others brought out new ramifications of the reciprocity program. On July 7, 1927, Whitney & Kemmerer, Inc., a coal broker, replying to a request from the New Haven for reports that called for the names of consignees and destinations as well as the volume of traffic to competitive points, said in part:

"It seems that the buying of railroad fuel at this time depends in a great measure on the commercial business which the railroad secures from the consignor. We have recently found this to be true on several of the roads which we are serving regularly, particularly the Boston & Albany, which is now asking us to divert business from the New Haven so they might have the long haul."

In September of the same year a report was received that the Whitney Company was diverting traffic from the New Haven because of the failure to secure orders for coal. During that year and 1929 the firm was awarded coal orders and on July 19, 1929, the Whitney firm acknowledged a contract calling for a minimum of 50,000 tons of coal during the year with the statement that "we will express our appreciation by giving every possible pound of traffic to your road that we can and we are diverting traffic now to your line at competitive points."

On June 7, 1928, subsequent to getting a contract for coal, Madeira, Hill & Co. submitted a tonnage statement showing substantial increases in the monthly shipments of coal over the New Haven and requested either an increase in its allotment or else stop orders. A contract statement of 1929 showed that this firm secured a contract to supply a minimum of 50,000 tons.

In May of the same year, Vice-President Campbell of the New Haven informed the purchasing department that Pattison & Bowns of Boston, another coal broker, was retaliating for insufficient coal orders by turning revenue away from the New Haven "at the rate of \$50,000 per year" and added that "if you can find a way to give Pattison & Bowns some tonnage it will insure our holding their traffic." This company secured a contract to supply a minimum of 50,000 tons a year.

Last year the fuel agent of the New Haven informed President Pelley that he could not recommend purchases from the Continental Coal Co. for 1930. The coal was developing too much ash when burnt. It was one of the "largest and most reliable producers in the East" and was also known as the company of Edward Hines, president of the Edward Hines Lumber Company. President Pelley received a telegram from Edward Hines and it was explained by Mr. Hines and the coal operator that the trouble could be overcome by screening improvements. This would increase the cost of the coal five cents a ton but "could be absorbed if the coal company

could sell direct to the road instead of through wholesalers". "Of course", said Mr. Hines in his telegram, "I will take a personal interest in any business we may have with your road," and the fuel agent, writing on the subject said, "From a recent talk . . . I have every reason to believe Mr. Hines, through his wood products, will give us business from time to time." The record showed that the coal company was contracted to supply a minimum of 200,000 tons of coal for the New Haven during 1930—50,000 tons direct and 50,000 tons through each of the three wholesalers named above.

Routing Over Pennsylvania

The correspondence with the Pennsylvania relative to coal buying, revolved chiefly around the fact that the road's coal supply is obtained in off-line territory. When C. E. Smith testified last week as to the relatively low average price paid by the road this year for its fuel, he was referring to the prices at the mines.* In contrast with \$1,816,000 paid to the coal producers in 1929, however, the road also paid \$3,212,000 to bring the coal to its line. The Pennsylvania sought the haul on this coal.

In April, 1925, G. D. Dixon, vice-president of traffic of the Pennsylvania, wrote a letter to Vice-President Campbell of the New Haven in which he said in part:

According to information received by me you have recently bought heavily of coal from sources on the Baltimore & Ohio on which the Pennsylvania does not secure the haul. . . . I cannot characterize such information as other than extremely disappointing and disquieting.

Vice-President Rice of the New Haven explained that approximately 450,000 tons were being purchased from mines located on the Pennsylvania and that "everything had been done" to purchase from the Keystone Coal & Coke Co., also located on that road but he said the price was prohibitive, and added that, in so far as transportation was concerned, the preference was with the Pennsylvania. "We have gone so far", he continued, "as to notify certain companies with which we do business that unless they routed shipments over the Pennsylvania, we would not accept them." He also wrote that he would give Mr. Campbell advance notice of purchases that could be routed over the Pennsylvania to New Haven and said further: "We furnish your office with copies of our orders and no doubt your office gives the information to the Pennsylvania." This correspondence showed that about that time the Brill Car Company of Philadelphia had arranged to ship a large number of street cars for Boston over a competitive line and the New Haven "refused to give the car maker a contract for certain rail motor cars until the routing of the street cars was changed to give the New Haven the haul."

The Pennsylvania was not satisfied with Mr. Rice's explanation for not shipping more coal over that road, however, as brought out in a letter written a short time later in which Mr. Campbell, referring to a conference with Walter Thayer, coal traffic manager of the Pennsylvania, said in part:

Mr. Thayer feels very bitterly . . . He referred to the cooperation of the Pennsylvania with us in the revision of divisions; to the stock interest of the Pennsylvania in the New Haven; to the joint investment of the two properties in the New York Connecting, and to the fact that the Lehigh Valley purchases a large part of its fuel supply on the Pennsylvania.

In view of Mr. Rice's objection to purchasing in the territory of the Pennsylvania at the time on the ground of excessive cost, Mr. Campbell also wrote a letter in which he said in part:

Mr. Thayer (referring to certain coal of another grade which was being purchased from a certain mine on that road)

* C. E. Smith was incorrectly reported in last week's issue to have testified that fuel contracts for 1929 coal were awarded at a price 54 cents above the lowest bid. The correct difference was 5 cents.

said that the coal was produced and shipped by the Graff Mining Company, who sold it to the Knickerbocker Fuel Company, who sold it to the McNeil Coal Company, who sold it to the New Haven—the implication being that the number of hands through which the coal passed, in his judgment must have added to the price which the New Haven paid for it.

G. D. Dixon, in another letter to Mr. Campbell said, "It is not always a question of price that will bring the greatest amount of money into our respective treasuries."

Directors Act

Jay Cooke, a director on the Pennsylvania, requested J. Horace Harding, a director of the New Haven, "to take up the matter with the New Haven people and see if we cannot improve the situation." This led to further negotiations in which it was proposed that the Pennsylvania should establish joint rates with the Baltimore & Ohio which would reduce the freight charge over the Pennsylvania sufficiently to compensate for the difference between the cost of comparable coal in the two territories, but this the Pennsylvania declined to do. As the period approached for 1927 contracts, further correspondence developed, including cablegrams from London, in which Pennsylvania executives again pressed for rearrangements of the New Haven's coal supply.

The correspondence showed that arrangements were later made so that certain locomotive coal purchased from mines on the Baltimore & Ohio would be diverted so as to give the Pennsylvania some of the haul, thus affording that road the full or part haul on a minimum of 1,525,000 tons in 1928. Early in 1929 spot orders were placed with the Keystone Company and contracts subsequently arranged calling for a minimum of 300,000 tons from that concern. The price was \$1.28 per ton at the mine as compared with \$1.15 paid to all other producers. As a result of these contracts with producers in Pennsylvania territory, and certain contracts made with New England wholesalers who were required to secure their coal in that territory and also as a result of the rearrangements, the traffic situation was adjusted, and Mr. Campbell wrote a letter to J. L. Eysmans, vice-president of the Pennsylvania, stating that Pennsylvania would receive a minimum revenue of \$2,800,000 from the new arrangement (an increase of approximately \$1,700,000) and continuing in part:

This is a nice piece of business and it is competitive to the Pennsylvania in that it formerly moved over the Baltimore & Ohio . . . I hope through joint effort the New Haven can be repaid through increased commercial traffic.

At the same time, the Baltimore & Ohio (whose tonnage of New Haven coal was cut), received a letter in which Mr. Campbell stated that the amount of coal placed on the Baltimore & Ohio, ranging from a minimum of 484,000 tons to a maximum of 599,000 tons, would produce from \$513,000 to \$635,000 revenue for that road and adding:

We consider it a nice piece of business, competitive to the Baltimore & Ohio and hope that through joint effort we can develop enough additional commercial traffic to equalize.

The Keystone Coal and Coke Co., the letters showed, promised to influence all the traffic they could for the benefit of the New Haven in return for its contracts placed with it and was given to understand that the road "would be willing to give it credit on a two for one basis for every car that was moved over the line and switched to a connecting line for delivery."

The explanation as to the manner in which the entire fuel supply could be obtained in the different coal districts and routed over the Pennsylvania as well as the Baltimore & Ohio without causing variations in the delivered price of the New Haven's coal was to have been clarified for the Commission on Friday.

The Commission's record on the fuel purchasing of the New Haven, while showing that a vigorous policy of reciprocity was adopted by the board in 1928, also brought out that opinion as to its soundness was not a unanimous one. In a report to the vice-president of purchases, written in July 1929, the fuel agent said in part:

Drawbacks to Reciprocity

There are two distinct drawbacks to the reciprocity method of buying.

First: It makes the seller the boss of the buyer whereas the reverse should be the case. To anyone with practical purchasing experience this means considerable. It means that in the event of a stiffening demand and higher prices (which always result in shrunken shipments on contract), the seller is prone to answer our complaints by saying that "We are doing the best we can and if you are dissatisfied, take back your contract and I'll take back my traffic." Again, under such conditions, with a let down in the preparation of the coal, resulting in poorer quality, the rejection by the buyer is quite apt to bring a similar retort from the seller.

Second: No purchasing officer can guarantee as high a quality of coal nor as good service and performance under contract when doing business with brokers and wholesalers as would be the case if he were buying from large, strong and financially sound producers.

In another letter written in July, 1929, this time to President Pelley, the fuel agent said in part:

A condition which I have been more or less expecting has come to the front quite prominently in the last few days. I refer to shippers controlling some competitive traffic over our lines and threatening retaliation—either openly or by inference—if we did not give them some coal business.

I have been wondering how far reaching our present method of buying will be, and whether there is not some danger involved, because there is not enough tonnage to satisfy all applicants, and whether in the final analysis we will experience a net gain or a loss.

The correspondence showed that argument of the fuel agent prevailed to the extent of restricting the purchasing through brokers to 50 per cent of the total requirements, and the proposal to designate in all contracts with brokers the specific mines from which the coal should be obtained and make the mine operator a party to the contract also prevailed, but, otherwise the reciprocity program prevailed.

Two Cars for One

Mr. Campbell's justification of the practise was contained in a letter written to Vice-President Rice early in 1929, in which he said in part:

This matter of trading coal patronage for competitive business is serious. I understand that the New York Central have a scheme of purchasing two tons of fuel for each ton of competitive coal given them by the producers of those to whom they give patronage. The Boston & Albany work this plan strong and I understand the Boston & Maine also to do so. We have lost a lot of coal recently from the Pratt Coal Company because of Boston & Albany patronage given in consideration of getting the haul. The Gorman Leonard Company recently lost 40,000 tons of Boston & Albany coal because it gave the Boston & Maine its business. While realizing the annoyance involved in distributing our patronage in small units, it is a condition we must meet or lose competitive traffic.

The report of the investigation of the Lehigh Valley, Erie and Delaware, Lackawanna & Western will be published in a later issue.

A SILVER LOVING CUP has been awarded to the Cleveland, Cincinnati, Chicago & St. Louis by the Smoke Abatement Board of Indianapolis, Ind., which is conducting a campaign to reduce smoke in the city. This railroad had a lower percentage of smoke ordinance violations than any other railroad operating in Indianapolis during October.

Mileage Rates Discussed by Chicago Traffic Club

MILEAGE rates and their relation to first class rates were discussed by members of the Traffic Club of Chicago at an open forum held in the club rooms on December 8, when various members voiced the opinion that a promiscuous adoption of mileage rates would harm both the shippers and the railroads. The unanimous disapproval of mileage rates by a group of shippers and railroad representatives was singular in that although complaints filed with the commission charging discrimination are usually contingent upon mileage, no one argued in favor of rates based on distance.

The discussion was opened by K. F. Burgess, general solicitor of the Chicago, Burlington & Quincy, who outlined the history of mileage rates in the United States, touching upon various cases wherein mileage rates at one time were favored and at another time opposed by the same sections of the country. In summarizing, he said the evidence indicates that, during the past, business development was encouraged by group rates rather than by mileage rates, that the advocating of mileage scales is a step towards government ownership and a further extension of these scales and that mileage scales tend to disrupt commerce and divides the country into sections and thereby curtails markets.

A. F. Cleveland, vice-president of the Chicago & North Western, said that rates should be made according to what the traffic will bear and should be adjusted to encourage the movement of traffic. With mileage scales, he said, it is impossible to afford shippers the opportunity of marketing their products in territories where other manufacturers are located. He also said that the mileage scale is so simple that an office boy can design such a scale, since no consideration is given the various problems of transportation and marketing. He also expressed the opinion that mileage rates eliminate competition and work to the disadvantage of both the carrier and the shipper.

Robert Hula, traffic manager of Clayton Mark & Co., referred to the adoption of mileage rates in various cases and told of the unfairness of these rates. He also expressed disapproval of the procedure of the Interstate Commerce Commission regarding the introduction of testimony pertaining to commodity rates in the recent class rate hearings.

E. S. DePass, one of the traffic officers of the Carnation Company, said that mileage rates might be all right if they are properly designed and if they maintain the proper relationship. He thought that carload rates should not be related to less-than-carload rates and that the fixing of rates should take into consideration the cost of service, the cost of handling and the value of the commodity. He did not think that mileage scales could be designed to take into consideration all factors.

Murray N. Billings, traffic manager of the Illinois Steel Company, said that the recent impetus given the consideration of mileage scales was brought about by chambers of commerce who have been studying the relationship of one city to another and who have complained of discrimination where the rates from comparable cities favor one or the other. He said that no single scheme of rates can be applied to the Trunk Line territory without doing harm to the railroads and the shippers. If mileage scales are not wanted, he said.

shippers and railroads should confer without the attitude that the shippers' problem is to bring rates down and the railroads' problem is to boost rates. He also displayed several charts which showed the effect of mileage scales on the various classes.

Louis C. Sorrell, professor of transportation at the University of Chicago, discussed the effects of mileage rates on marketing and the development of industry. He favored rates which considered the various factors of transportation and marketing.

Rivers and Harbors Congress

WASHINGTON, D. C.

EXPEDITED development of the inland waterways of the country, or all those for which a board of engineers or a committee or Congress can find figures to which they can refer as constituting "economic justification," was urged and demanded as a panacea for many of the economic ills of the country by speakers at the annual convention of the National Rivers and Harbors Congress held in Washington on December 9 and 10. Enlarged expenditures by the government to widen and deepen the "God-given highway channels" of the rivers were advocated as remedies for the unemployment problem, the troubles of the farmers and even, by many of the speakers, for those of the railways, whom they proposed to "relieve" by taking their bulky freight off their hands and then to aid by developing traffic to give back to the railways later. Most of the speakers disclaimed any hostility to the railways or even any desire to compete with them, saying that most of their freight would be either brought to them by a rail line or turned over to one later to complete the final delivery, at rates which will reflect the "low" cost of water transportation to inland communities.

While the convention was in session the House passed the first "relief bill" recommended by President Hoover, appropriating \$110,000,000 for an emergency construction program, of which \$22,500,000 is to be allocated to river and harbor work.

Resolutions were adopted commending the Administration and Congress for the "splendid progress being made in extending waterway transportation into the agricultural sections of our country for the purpose of bringing relief from high transportation charges to the distressed farming sections" and urging that such work be pushed with all speed.

The resolutions also included the following: "We regret and deplore the efforts of the railroads to take advantage of present conditions to intensify their unwarranted attacks upon waterways. We direct their attention to the fact that the National Rivers and Harbors Congress or any other waterway organization at no time have advocated any policy or antagonism or opposition to the railroads, but on the contrary has sought only to promote the progress and prosperity of our country and the welfare of its people in which the railroads themselves should recognize their own vital interest. We have always advocated and urged every needed protection for the railroads to the end that they may continue to render adequate service to the American people and receive therefor an adequate and profitable return. A policy of improving rivers and harbors in order that transportation by water may be available for commercial use to augment and supplement transporta-

tion by rail and a broad national program to carry out such a policy have been approved by the American people and adopted by their representatives in Congress, and no efforts from whatever source to defeat or delay that program will be tolerated by the people of our country. In these circumstances, we submit for the consideration of the railroads that their present tactics in seeking to exploit for their own benefit a national condition which has operated to the temporary disadvantage of practically every citizen of our country are not in keeping with that spirit of fair play which is usually characteristic of American citizens and American institutions. We have faith that the wisdom of our people will not allow any usable and economic method of transportation to languish through lack of fair and just treatment."

The Secretary of War, Patrick J. Hurley, pointing out that the last river and harbor act authorized all projects necessary to link together the whole Mississippi river system, said that "we shall go on with this work at an accelerated rate" and that allocations of funds will be made to carry on the work of the various projects as rapidly as sound engineering will permit. "What we hope to do," he said, "is to extend to the great agricultural interior of the country the benefits of that form of low cost transportation which has enabled the states located upon the lakes, the oceans and the Gulf to develop and prosper."

Major General Lytle Brown, chief of engineers of the U. S. Army, after outlining the work now under way or projected, said that railway opposition to waterway development should cease in the light of his declaration that "so far as the Corps of Engineers is concerned, there will be no waterway improvement recommended to Congress that is not justified by the best and most disinterested judgment obtainable in the country" and that since 1902 it has rejected two-thirds of the projects proposed to Congress because they were not considered economically feasible. He objected to comparisons between railway rates and figures including in the cost of waterway transportation interest on the expenditures for waterways since the beginning of their improvement. He said the latter figures are a matter of very accurate public record but that the total cost and expense to the people of the railways is not and that comparisons of cost must be based on the same form of analysis to be of any value.

Samuel O. Dunn, editor of the *Railway Age*, addressed the meeting on December 10 on "The Transportation Situation," declaring that while so many of our public men and business men are making addresses and holding conventions to promote the development of waterways, our most important means of transportation, the railways, are drifting straight toward disaster, and most public men and business men are doing nothing to avert that disaster. After discussing the present situation of the railways and the effects upon them of other forms of transportation, he pointed out that the cost of transportation by inland rivers and canals, as distinguished from the cost on the Great Lakes or the ocean usually referred to by the waterway advocates, is in excess of the cost by railway when the amount of the taxes required to develop and maintain the waterways is included.

"The public, and especially business men," he said, "profess to want, among other kinds of transportation, good service rendered by railways owned and managed by private companies; and yet they are allowing and even urging their governments so to subsidize other

means of transportation, and so to differentiate between them and the railways in regulation, that railway rates are kept too low, enormous amounts of traffic are being diverted to other forms of transportation, and our ability in future to maintain the earning capacity and service of the railways under private ownership is being seriously threatened."

Senator Brookhart, of Iowa, replied with a general attack on the railways, their rates, and the transportation act, along the lines he has followed for many years, asserting that the roads have ruined the farmers by high freight rates and that if they find themselves unable to compete with water transportation, "Uncle Sam will do it for them." He referred to that part of the cost of waterways which has been defrayed from taxation as "imaginary."

Other speakers were: Simeon D. Fess, Senator from Ohio; John F. Galvin, chairman Port of New York Authority; T. V. O'Connor, chairman of the Shipping Board; S. Wallace Dempsey, chairman of the House Committee on rivers and harbors; Riley J. Wilson, president of the National Rivers and Harbors Congress; James M. Curley, mayor of Boston; Walter W. Williams, vice-president, Illinois Chamber of Commerce; John G. Cooper, Representative from Ohio; James Francis Burke, general counsel, Pittsburgh Chamber of Commerce; J. Hampton Moore, president Atlantic Deeper Waterways Association; J. W. Carpenter, president, Texas Power & Light Company, and S. S. Sandberg, commissioner United States Shipping Board.

Curry Grain Door

AN improved removable grain door, designed to be leak-proof and strong enough without reinforcement to effect important economies in the cooping of box cars used for the transportation of grain, patents on which have been applied for, is being introduced by Curry & Co., 407 S. Dearborn street, Chicago. Like the General Managers' standard grain door, the Curry door is 20 in. wide, 7 ft. long and weighs about 60 lb. It is manufactured of narrow, good quality, grain-tight lumber, 1½ in. thick, dressed on all sides, and having the edges glued together with an improved water-proof glue which strengthens and stiffens the door to such an extent that doubling the bottom courses is unnecessary. The door ends are then treated with a somewhat thinner solution of the same glue, tending to seal them against moisture and minimizing the tendency of the corners to split off when the doors are pried from the door posts, or subsequently roughly handled.

The built-up construction of the Curry grain door is illustrated in the drawing. The dressed edges are said to make possible grain-tight joints between the doors without any special precautionary measures such as doubling the doors and lapping the joints. In accordance with the usual practice, the doors are secured in place in the car by being nailed lightly to the door posts with four tenpenny nails driven in at an angle so that when each door is in turn pried up with a bar the nails bend over and are withdrawn from the door posts readily, releasing the door without damage to it.

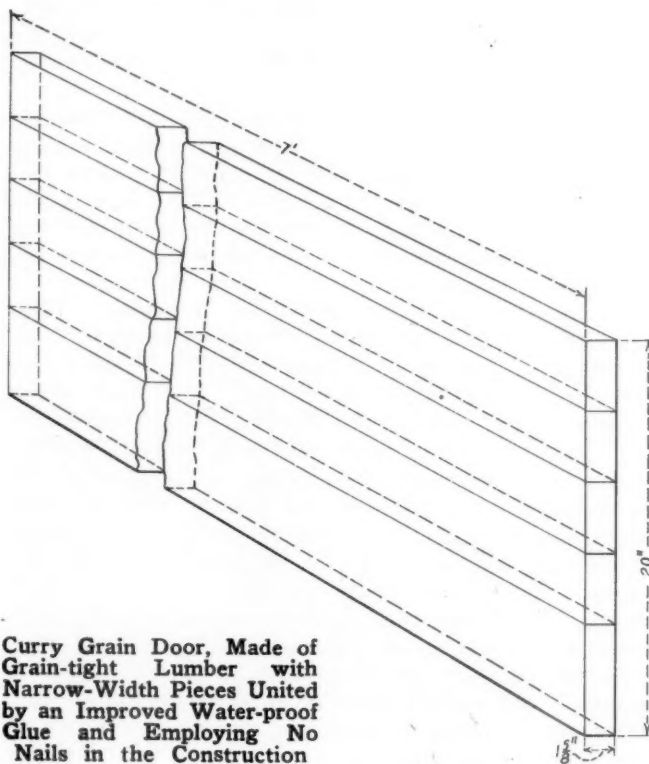
Only seven Curry doors per car are required, three in the doorway through which the grain spout is inserted in loading the car, and four in the opposite doorway. The General Managers' standard grain door, on the

other hand, made of two thicknesses of one-inch, low-grade lumber, selected for grain-tightness rather than for strength, necessitates the doubling of the two lower doors on each side of the car and requires a total of 11 doors. Sometimes, cars may be undercoopered with single thicknesses of standard grain doors, resulting in damage claims. More often, cars are overcoopered, as many as 13 doors being used per car. On the average, extensive surveys are said to have shown that for the loading of the heavier grains, constituting about 90 per cent of the grain movement, it is common practice to use 11 standard grain doors, four of which are applied to give additional strength at the bottom courses. This may be compared with 7 doors required when the Curry type is used.

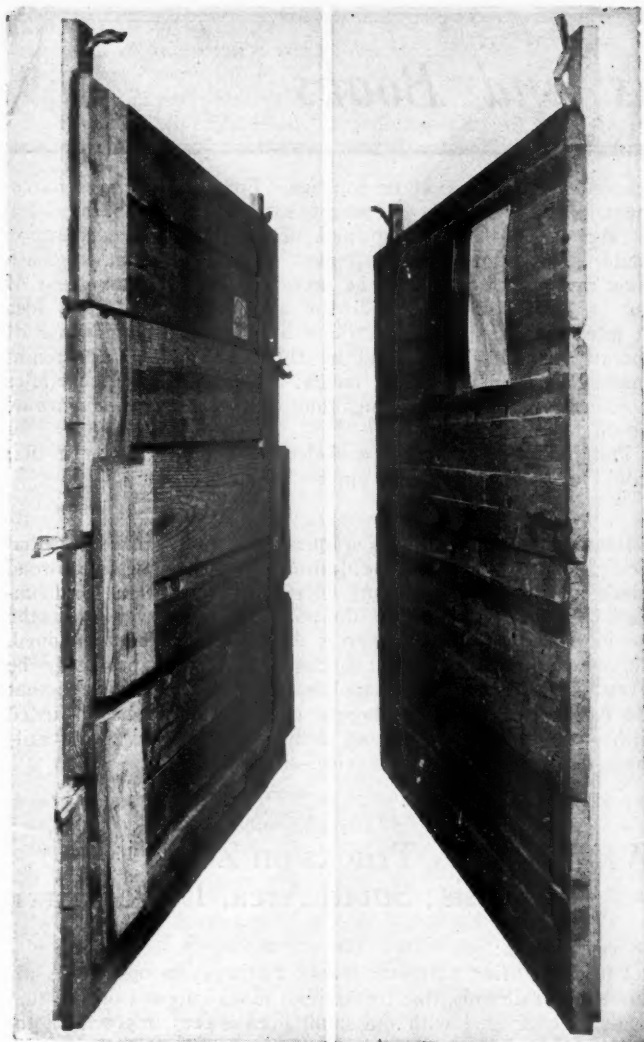
Typical examples of freight-car doorways, coopered with the General Managers' door and with the Curry grain door are shown at the left and right, respectively, in one of the illustrations. It will be observed that caulking paper is applied at all joints with the standard door, whereas it is recommended for application with the Curry door only where the floor board, side posts or grain doors have become slightly warped or damaged.

While the initial cost of the individual Curry door is somewhat greater than that of the present standard door, the fact that four less doors are required makes the aggregate cost of cooping the car practically the same with either type of door. No excessive premium is therefore paid for the more effective service, increased life and much better appearance claimed as advantages of the new doors. In addition, it is maintained that the reduction in the number of doors required per car reduces by over one-third the grain doors which must be handled and hauled over the road annually as company material; effects a saving of 240 lb. of tare weight, or non-revenue freight, per car loaded; saves labor and time in cooping; expedites car handling at stations and thus helps in the attainment of more car-miles per day.

Curry grain doors may be stenciled with the names of originating carriers, and agents and shippers charged



Curry Grain Door, Made of Grain-tight Lumber with Narrow-Width Pieces United by an Improved Water-proof Glue and Employing No Nails in the Construction



Freight Car Doorway Coopered with Six G.M. Standard Doors (Left) and Four Curry Doors (Right)—Calking Paper Is Used Only to a Limited Extent with the Curry Doors

with them in accordance with the practice of some roads in an effort to secure the return of the doors, or an accounting for them. In case the doors are lost through off-line shipments, or otherwise, however, it is expected that eventually about as many doors will be received back from foreign connections as are lost, and, in the meantime, the actual money loss per car set of unrecovered doors will be no greater than at present since only seven Curry doors will get away as compared to eleven of the present standard door.

THE NORTHERN PACIFIC has recently expended more than \$750,000 for the purchase and improvement of industrial property along its lines at Fargo, N. D., Yakima, Wash., and Seattle, Wash.

STORE DOOR DELIVERY SERVICE on the Central Railway of Peru has been operating in Lima, Peru, for the past month, according to recent Commerce Department reports. At the present time six Morris-Oxford trucks are in use but as the business increases this service will be expanded. It is now possible to ship goods by rail from Callao, Peru, and have them delivered anywhere in the Lima urban district; that is, Lima, San Miguel, Magdalena, Miraflores, Chorillos and Barranco. At present it is understood that this service is not earning profits, but the railroad has installed the service because it expects to receive increased freight receipts from Callao to Lima.

Looking Backward

Fifty Years Ago

The railroad commissioners of Georgia have ordered a reduction of passenger rates in that state to 3 cents per mile, and on some of the minor roads to 4 cents, to take effect February 1.—*Railway Age*, December 10, 1880.

The governor of Massachusetts has revived an obsolete state law forbidding the movement of railway trains on Sunday, and made it apply solely to the Hoosac Tunnel road, which the state owns. The general manager of the Erie has announced that in view of the refusal of the commonwealth to permit passenger trains to pass over its road on Sunday, the sleeping cars which have heretofore been operated from Chicago and Cincinnati to Boston via the Erie and the Hoosac Tunnel & Western [now part of the Boston & Maine] will be discontinued on and after December 29. Meantime Sunday trains continue to run on other roads in Massachusetts.—*Railway Age*, December 16, 1880.

Twenty-Five Years Ago

The Southern now controls that portion of the Tennessee Central between Harriman, Tenn., and Nashville, 166 miles. This includes the Carthage and Wilder branches and the entire line will be operated as a part of the Nashville division of the Southern.—*Railroad Gazette*, December 15, 1905.

The maximum working pressure for locomotive boilers has been gradually increased with the general trend of enlarged proportions and the demand for greater power. In the United States this pressure has been nearly doubled in the past 30 years. For some years prior to 1880 the standard boiler pressure on many roads was 125 lb. In 1885, 150 lb. was used by the more progressive lines, and in 1890, 160 was quite generally used. In 1895 the pressure had increased to 180 lb., and in 1900, 200 lb. was tried by a few roads. While some roads have gone as high as 210 and 220 lb., there are now seen signs of a decided change, making 200 lb. the limit, with a tendency to go below rather than above it.—*Railway Age*, December 15, 1905.

Ten Years Ago

The Chicago, Milwaukee & St. Paul has leased the Chicago, Terre Haute & Southeastern, running from Chicago to Westport, Ind., 374 miles, and passing through the Southern Indiana coal fields, for a period of 999 years.—*Railway Age*, December 10, 1920.

A. C. Mann has been elected vice-president of the Illinois Central, in charge of purchases and supplies, with headquarters at Chicago. W. A. Kingsland, assistant general manager of the Canadian National, with headquarters at Montreal, Que., has been appointed general manager, with the same headquarters.—*Railway Age*, December 10, 1920.

The Supreme Court of the United States, in a decision rendered on December 6, ordered the dissolution of the combination effected through the intercorporate relations between the Lehigh Valley Railroad, the Lehigh Valley Coal Company, Coxe Brothers & Co., the Delaware, Susquehanna & Schuylkill Railway and the Lehigh Valley Sales Company. The decision was rendered on the ground that the combination has constituted a restraint of trade in violation of the Sherman anti-trust law and has resulted in a violation of the commodities clause of the interstate commerce act.—*Railway Age*, December 10, 1920.

Communications and Books

A National Association of Car Men

SEATTLE, WASH.

TO THE EDITOR:

I read with considerable interest the editorial which appeared in the *Railway Age* of August 9, 1930, which pointed out the need for a national association of car men. Personal experience impels me to say that it is a necessary adjunct to the work of the American Railway Association and is in line with the Department of Commerce efficiency program which includes the elimination of waste, etc.

With such an organization something might be accomplished toward the elimination of abuse of freight-car equipment, which costs the railroads an excessive sum. Ignorance of, or contempt for the property of others is the underlying cause of much misconduct.

The question of stowing certain types of loadings in box cars in such manner as to prevent shifting in transit from shocks when switching, is a problem to many shippers. Even shippers of lumber get many complaints of damaged material because of shifting in transit, the question having been raised at a conference of lumber manufacturers and car builders at Portland, Ore. on May 28, 1930. The question referred to specified-length loadings such as is usually ordered by eastern car builders, such material being surfaced smooth on both sides thereby causing it to slip and shift easily.

It is estimated several thousand box-car loads of this high grade specified-length material for car sheathing leave Oregon and Washington annually, which are destined to various eastern car shops. Ninety-five per cent of these cars are incorrectly loaded, notwithstanding the fact that a simple new process of loading such material would eliminate all possibility of shifting from shock in transit.

P. D. RYAN.

How Retain Package Freight Business?

SAN FRANCISCO, CAL.

TO THE EDITOR:

Is not the time fast approaching when steam railroads will have to remodel their operating methods in view of the competition which they are now meeting and which promises to become more acute? Steam railroads are a vital part of a country's necessities. They are in fact a governmental necessity in time of an emergency. There is no other means of transportation that can handle enormous volumes of freight as expeditiously. They require, however, the means to live. On the passenger side they compete with private autos, airships in a small way, and commercial buses on long and short hauls.

Profitable operation of these long haul buses is problematical. They are on an accelerated old time stage coach basis; offer none of the comforts of a steam railway coach and, all costs considered, the transportation is not much cheaper, if at all. On the freight side the railroads meet on transcontinental freight, water line competition, which is ever expanding. On short hauls, motor trucks; and these are operating over longer distances as time goes on. The trucks offer an express service at a freight rate, and compete with the Railway Express Agency. In these days it is not necessary to carry large stocks of goods. They can be quickly replaced, interest on purchases saved, chances of dead stock reduced.

It would seem that this l.c.l. movement will increase from now on and, as it is desirable freight, the railroads should go more actively after it. They own the Railway Express Agency. For a certain sum they handle its shipments on their passenger trains. On many runs these trains are lightly patronized and heavier consists could be handled by the power.

Why not disband the Express Agency and let the railroads do the business as individuals? They are running package cars now. Why not handle the freight of these cars on the passenger trains, leaving for the freight trains the low grade traffic—carload and l.c.l., running these freight trains on slow

schedules with a maximum tonnage. For the passenger movement present express equipment would be available as well as the trucks for pick-up and delivery, and the operation could be used on local movement as well as coast to coast. New rate structures would be necessary and the movement of the passenger schedules call for a higher basis. The idea in mind is that passenger trains have to run—their cost of operation would be reduced by the earnings on the freight handled by them. Heavier freight trains on slower schedules would return larger earnings and the net operating income would be increased.

The foregoing is simply a skeleton. Has it any merit that would warrant flesh being put on it?

S. C. THOMSON.

[Our correspondent asks a question. Our answer is that we agree with him as to the desirability of keeping in railroad hands the traffic now being lost to motor trucks and unregulated forwarders. We do not agree, however, with the opinion that the Railway Express Agency should be abandoned. This seasoned and efficient organization might profitably be given more to do, rather than less. It has been suggested that the Agency might be the logical organization to be entrusted with store-door collection and delivery of freight, if the railroads decide to offer that service.—EDITOR.]

Why Not Tax Trucks on Zone Basis; Small Area, Lower Tax?

BANGOR, PA.

TO THE EDITOR:

The competition of motor trucks as they now operate, is not fair to the railroads, due to the high taxes imposed on the railroads as compared with the small license fees imposed on the trucks. The improved highways over which the competitive trucking service is operated are constructed from taxes paid in large measure by the railroads.

Why not impose a tax on the trucking companies to equalize the taxes imposed on the railroads, plus their maintenance of way costs? If a truck performs service within city limits, issue a license tag accordingly. If service is performed intrastate, issue a license tag at a higher fee accordingly. And if service is performed interstate, issue a still higher-priced license tag accordingly. In all cases, the taxation should be based on the extreme boundary lines of the territory in which service may be performed and on the same ratio as railroad taxes and maintenance of way costs.

C. H. SNYDER,

Agent, Lehigh & New England.

New Books

Proceedings of the International Railway Fuel Association.—Published by the International Railway Fuel Association, 700 La Salle Street Station, Chicago. 568 pages, illustrated. 6 in. by 9 in. Flexible red-leather binding.

The proceedings of the 1930 convention of the International Railway Fuel Association, which was held at Chicago, May 6 to 9, indexes reports on Steam Turbine Locomotives; Diesel Locomotives; Front Ends, Grates and Ashpans; New Locomotive Economy Devices; Locomotive Firing Practice, both oil and coal; Inspection and Preparation of Fuel; Fuel Conservation Bulletins and Cartoons; Fuel Distribution and Statistics; Classification of Coal; Storage of Coal and Oil; Locomotive Fuel Stations, and Stationary Boiler Plants, both coal and oil. The addresses presented at this convention were by W. J. Tapp, fuel supervisor, D. & R. G. W.; J. S. Pyeatt, president, D. & R. G. W.; Samuel O. Dunn, editor, *Railway Age*; C. E. Bockus, president, National Coal Association; F. H. Hardin,

assistant to president, N. Y. C., and R. E. Woodruff, vice-president, Erie. Papers were presented also by H. N. Rodenbaugh, vice-president, F. E. C., whose topic was "Should the Railways Expect Decreased Fuel Costs?"; D. L. Forsythe, St. L.-S. F., who discussed "Locomotive Operation in Extended Service," and J. C. Nolan, Gulf Coast Lines, who discussed "Lignite Coal."

American Railway Signaling Principles and Practices; Chapters IX and XVIII. Paper pamphlets. Signal Section, A. R. A., 30 Vesey street, New York City. Price 25 cents and 35 cents.

Secretary R. H. C. Balliet has issued two pamphlets containing respectively the ninth and eighteenth chapters of the forthcoming comprehensive treatise on American Railway Signaling Principles and Practices. The price of each is 25 cents to members and to railroad employees, and 35 cents to non-members. The total number of chapters now completed is 12, namely: Chapters II, Symbols, Aspects and Indications; V, Batteries; VI, Direct Current Relays; VII, Direct Current Track Circuits; VIII, Transformers; IX, Rectifiers (including fundamental theory of alternating currents); X, Alternating Current Relays; XI, Alternating Current Track Circuits; XII, Semaphore Signals; XIII, Light Signals; XVIII, Electro-Pneumatic Interlocking; XXIII, Highway Crossing Protection.

The Story of the Railroad "Y," by John F. Moore, formerly senior secretary, Transportation Committee, Y. M. C. A. Illustrated, 309 pages, 6 in. by 9 in. Published by The Association Press, 347 Madison Avenue, New York. Price \$2.

The Railroad Y. M. C. A. celebrated its semi-centennial anniversary eight years ago. Meeting a vital and challenging need when it was first established in 1872, it has kept pace with the changing times and conditions and in a larger and broader way is now serving the railway employees and managements under entirely different conditions from those existing when it was founded. Mr. Moore, who served for many years as the senior secretary of its supervising committee and particularly through the critical years of the World War, understands the movement and its spirit as do few other men. It is fortunate that he could be drafted for the task of tracing its growth and development, of interpreting its spirit and functions, and of pointing out directions in which it must expand to meet future needs. No man could better perform this task at this time. Always alert to changing conditions and challenges for larger service, with a winning personality and a gift of expression—even poetic at times—he was a worthy successor to C. J. Hicks in the senior secretaryship.

The book is in no sense a history or a chronological record of progress. With keen insight, the author in a skillful and unique way has touched upon the more salient features of the work, from its inception to the present—a living and interpretive story rather than a record of events. It is well to remind ourselves of the fundamental principles upon which the structure has been built, to recognize the hazards which it has encountered and overcome, and to have the forward look from one not now confused by the details of administration, but standing as it were on the side lines and evaluating the situation from a more or less impersonal basis. This book will be appreciated by the great number of railway workers and officers who have served so loyally in promoting the Railroad Y and in making its services more effective and helpful.

Books and Articles of Special Interest To Railroaders

(Compiled by Elizabeth Cullen, Reference Librarian,
Bureau of Railway Economics, Washington, D. C.)

Books and Pamphlets

American Direct Investments in Foreign Countries, by Paul D. Dickens. "Foreign 'direct investments,' as herein considered, include those commercial and industrial properties situated abroad and belonging to residents of the United States and its Territories, from which a return is normally expected." p. 1. "Geographic distribution of investments" p. 8-28 include

tables showing investments in railroads and communication and transportation generally by countries. Trade Information Bulletin No. 731, U. S. Bureau of Foreign and Domestic Commerce. 57 p. Published by U. S. Govt. Print. Off., Washington, D. C. 10 cents.

Annual Report of the Board of Regents of The Smithsonian Institution . . . 1929. Includes in the General Appendix "The Gulf Stream and its Problems" by H. A. Marmer, p. 285-307, "The Population of Ancient America" by H. J. Spinden, p. 451, in the compilation of which the rainfall records of various Central American railroads were used, p. 471, and "The Beginning of the Mechanical Transport Era in America" by Carl W. Mitman, p. 507-551. The last will be of especial interest because of the detail given on the early history of locomotives, train brakes and couplers, and the biographical sketches of the "early railroaders." Profusely illustrated. 622 p. Pub. by U. S. Govt. Print. Off., Washington, D. C. \$1.75.

Co-ordination of Motor Transportation—Statistical Summary of Investment and Operating Figures Reported by Class I Railways in Questionnaire. Docket 23400. 13 sheets. Issued by U. S. Interstate Commerce Commission, Washington, D. C. Apply.

English in the Law Courts; The Part That Articles, Prepositions and Conjunctions Play in Legal Decisions, by Margaret M. Bryant. Further exposition of the value of so-called "little things", issued as one of the studies in English and comparative literature of Columbia University. 322 p. Pub. by Columbia University Press, New York City. \$6.

Land Utilization and the Farm Problem, by L. C. Gray and O. E. Baker. See symbol for railroads in "Principal Kinds of Land Ownership in the 11 Western States" p. 49. Miscellaneous Publication No. 97 of the U. S. Department of Agriculture. 54 p. Pub. by U. S. Govt. Print. Off., Washington, D. C. 25 cents.

1930 Supplement to "Railway Accounting Procedure." Specified pages for insertion in the Procedure. "The corresponding pages, now in the book, should be removed but preserved where they deal with mandatory rules or mandatory forms." Pub. by Railway Accounting Officers Association, Washington, D. C. 50 cents.

Periodical Articles

The Chicago, Milwaukee and St. Paul Railroad: Recent History of the Last Transcontinental, by Arthur M. Borak. "Recent" means since 1900. Journal of Economic and Business History, November 1930, p. 81-117.

The Motor Truck in the Food Industry, by E.A.K. "Railroad truck lines" p. 7-11. Armour's Monthly Letter to Animal Husbandmen, November 1930, p. 1-16.

The Problem of Working Main Lines at Very High Speeds—Trial Runs of a Propeller-Driven Carriage on the Line from Burgwedel to Celle (Germany). Description of the railcar that looks like a Zeppelin. "The construction comprises a framework of steel tubing with coachwork filling. Speaking on broad lines, the builders have used light-weight alloys, wood, insulating materials and cloth . . . The propulsion-motor is a 550-H.P. air-engine . . . There are two systems of braking . . . The maximum speed attained so far was 182 km. (113 miles) . . . The running . . . is extremely quiet . . . the vehicle only constitutes the first step in the development of a high-speed railway . . ." Illustrated. Bulletin of the International Railway Congress Association, November 1930, p. 2182-2186.

Railway Transport in the Soviet Union—A Statistical Review. "The general reorganization of the railway system . . . will be carried out to a considerable extent on the basis of American experience." p. 467. Economic Review of the Soviet Union, December 1, 1930, p. 465-468.

The Soviet Railway System by Ralph Budd. "During our visit in U. S. S. R., we found the railways functioning quite normally and freight and passengers being moved with fair promptness . . ." Economic Review of the Soviet Union, December 1, 1930, p. 464-465.

Odds and Ends of Railroading

Former Northwest "Mountie"

Arthur A. Goodsell, assistant special agent on the Iowa division of the Illinois Central, is one of the few railroaders in the United States who are former members of the Royal Northwest Mounted Police of Canada.

Abyssinians Enjoy Ride

Malakee Bayen and Kentiba Gabru, envoys to President Hoover from the Emperor of Abyssinia, claim that their greatest thrill in the United States was a ride on the locomotive of the Capitol Limited of the Baltimore & Ohio, between Baltimore and Washington.

A Day and Night Painter

When T. M. Davis, foreman painter for the Southern Pacific at San Francisco, gets through with his daytime work of painting locomotives and coaches, he seeks relaxation at home. This relaxation consists of painting locomotives and coaches. However, the ones he paints at home are on canvas, and he has attained a considerable reputation as a painter of railroad scenes.

The Romance of the Whistle

Railroad men believe that they will eventually be able to devise a railroad whistle which will shoot its shaft of noise directly to the railroad crossing instead of scattering it all over the countryside. While this would be highly efficient, and while any step to diminish the daily amount of noise in this noise-ridden civilization of our ought to be welcomed we're not sure that we're entirely in favor of this plan.

The railroad whistle is in a class by itself. It is one of the most romantic sounds one ever hears. To lie in bed, late at night, and hear some distant flyer whistling for a crossing, is to experience the feeling that one has heard the eerie horns of elfland blowing beyond the horizon. The note is haunting beyond words, with an insistent melancholy that defies description. We should be sorry to be deprived of it.—Camden Courier.

Relic Yields to March of Progress

One of the relics of the past which recently gave way to the march of progress in Philadelphia is the old bell which for 65 years called Pennsylvania employees to duty and dismissed them to their homes from the cupola of the master mechanic's office at the West Philadelphia shops. This is



The Old Bell Passes Out

one of the many historic landmarks and objects long familiar to railroad employees and residents of West Philadelphia which are disappearing in the wake of steam shovels and wrecking crews as the Pennsylvania clears the way for its new passenger terminal on the west bank of the Schuylkill river.

An Ambitious Cook

Railroad offices receive from time to time peculiar requests and conscience letters are not infrequent, but they seldom receive letters asking for payment for service which has been performed more than a score of years ago. But the Northern Pacific received a letter a few days ago from a Minneapolis man, who said that the railroad was indebted to him for six days' pay for service rendered as a third cook on one of its dining cars in July, 1907. Perusal of the records showed that this man was issued a time check in May, 1907, for \$3.66, but no record could be found of his six days' service and he was so advised by the superintendent of dining cars.

Naming the Baby

Cecilie Norma Rollande Turgeon is the name of a Montreal girl who was born on a railway train. It was a train on the Canadian National, and because the parents were very grateful to the crew for the assistance rendered in the emergency they chose names whose initials were identical with those of the road. C. N. R. Turgeon ought always to remember the place of her birth. And she ought to be thankful that she was not born on a boat of the New Bedford, Marthas Vineyard and Nantucket Steamboat Company. Or, for that matter, on a train of the New York Central & Hudson River.

Thus both of the great Canadian systems are now distinguished by having girls named after them. The rumor that the advertising department of a certain prominent road in "The States" is to offer prizes designed to encourage citizens to use its trains as places of rendezvous with the stork has not been confirmed.

Early Sleeping Cars

In connection with the discussion in this department as to early sleeping cars, the following quotation from the *Railway Age* of November 24, 1905, is interesting:

"Shortly before his death on October 5, 1905, at Bloomington, Ill., Leonard Seibert, a veteran employee of the Chicago & Alton, gave an account of the building of the first sleeping car under the direction of George M. Pullman. It is given herewith: 'In the spring of 1858 Mr. Pullman came to Bloomington and engaged me to do the work of remodeling the Chicago & Alton coaches into the first Pullman sleeping cars. The contract was that Mr. Pullman should make all necessary changes inside of the cars. After looking over the entire passenger car equipment of the road, which at that time consisted of about a dozen cars, we selected coaches Nos. 9 and 19. They were 44 feet long, had flat roofs like box cars, single sash windows, of which there were 14 on a side, the glass in each sash being only a little over one foot square. The roof was only a trifle over six feet from the floor of the car. Into this car we got 10 sleeping car sections, besides a linen locker and two washrooms—one at each end. The wood used in the interior finish was cherry. Mr. Pullman was anxious to get hickory, to stand the hard usage which it was supposed the cars would receive. I worked the spring and part of the summer of 1858, employing an assistant or two, and the cars went into service in the summer of 1858. There were no blue prints or plans made for the remodeling of these first two sleeping cars, and Mr. Pullman and I worked out the details and measurements as we came to them. The two cars cost Mr. Pullman not more than \$2,000, or \$1,000 each. They were upholstered in plush, lighted by oil lamps, heated with box stoves and mounted on four-wheel trucks with iron wheels. The berth rate was 50 cents a night. There was no porter in those days; the brakeman made up the beds.'"

NEWS

Bus Bill is Returned to Senate Committee

*Vote of 51 to 29 removes any
probability of action at
present session*

After three days of debate in the Senate the bill for the regulation of interstate motor bus transportation was re-committed to the committee on interstate commerce by a vote of 51 to 29, on a motion introduced by Senator Smith of South Carolina. He contended the bill should be sent back to the committee for revision in the light of the controversies developed in the debate and this action is regarded as removing any probability of action on the bill at this session of Congress.

The bill in its present form was not satisfactory to the principal advocates of regulation, and on the other hand was bitterly opposed by Senators who objected to the idea of restricting bus operation by regulation. One of the objections of the railroads was removed, however, by the adoption of an amendment proposed by Senator Glenn, of Illinois, providing that nothing in the bill shall be construed "to prevent railroad corporations from organizing or operating motor carriers where no consolidation, merger, or acquisition of control of motor carriers is involved in such organization or operation." Senator Glenn said he feared that the provision already in the bill would prevent railroad operation of bus lines. Senator Couzens assented to the amendment, on the ground that the object of the bill was to prevent the railroads from buying existing bus lines, but not to prevent them from starting lines of their own.

Some sentiment in favor of regulating truck transportation as well as the passenger business was indicated in the debate.

Freight Claim Agents Call Off Meeting

The annual meeting of the Freight Claim Division of the American Railway Association, which is scheduled to be held at Louisville, Ky., on May 26-29, 1931, will be deferred in view of the economic conditions confronting the carriers, as well as industry in general. All present officers, committee men and chairmen of committees will continue in office until the next annual session. The customary preliminary meetings of standing committees will not be held.

Highway Carriers Protest Low Rail Fares

The Interurban Transportation Company of Alexandria, La., has filed an application with the Louisiana Public Service Commission protesting against the two cents a mile passenger rate which the Texas & Pacific has been authorized to place in effect in that state. The protest of the Interurban Transportation Company delays the effective date of the reduced rates until such time as the hearing has been completed.

Railway Labor Leaders Plan Program

The Railway Labor Executives Association, composed of the heads of 21 railway labor organizations, adjourned a three-day meeting in Washington, D. C., on Wednesday, after unanimously adopting a joint program which includes the shorter work-day for train service employees, the shorter work-week for others, and proper regulation of transportation by highway, pipe lines and waterways, so as to eliminate unfair competition in the railroad industry." In furtherance of this program, labor executives will seek conferences with interests involved, and at a meeting in Cleveland, Ohio, next week, will consider a proposal for a national conference with railway executives. If demands of the unions are refused the next step would be to serve demands on one road and carry the case to the point of mediation under the law. Preference was expressed for the method of direct negotiation with the roads instead of efforts to attain desired ends through legislation. It was announced that it was agreed that reduction of the eight-hour day to six hours for men in transportation service and reduction of the six-day week to five days in the case of others would be used only to restore laid-off men and not as a movement for a wage increase. The question of reduction of mileage by engineers and conductors was left for further consideration.

I.C.C. Elects Brainerd Chairman

The Interstate Commerce Commission has announced the election of Commissioner Ezra Brainerd, Jr., as chairman for 1931, succeeding Commissioner Frank McManamy.

Plan to Aid Railways Suggested by Loomis

*Restrict assessments, facilitate
rate changes and regulate
competitors, he says*

E. E. Loomis, president of the Lehigh Valley, in a statement issued on December 8, outlined his views in connection with the present railroad situation. The statement included suggestions as to what he thought might reasonably be done "to eliminate the severe strain on the credit of the rail carriers without disturbing the present system of operation, which is eminently satisfactory to the shipping and traveling public." Specifically, Mr. Loomis suggested that the tendency to force railway funds into non-revenue producing channels be checked, that rigid regulatory rules in connection with rate adjustments be revised and that adequate regulation be imposed upon railway competitors. Before outlining his plan, Mr. Loomis dismissed other current suggestions to meet the situation such as general advances in rates, consolidation of railroads and government ownership; he pointed to difficulties in each case and dismissed each of these latter proposals as impractical.

The statement follows in full:

Increasing concern over the plight of the railroads is encouraging for the future of the industry. The severe losses in revenue producing traffic as a result of the operation of barge lines on toll free and governmental subsidized waterways, the increasing use of unregulated trucks and buses on public highways, the building of new pipe lines for carrying oil and gasoline, and the high tension power lines reducing the nation's coal requirements, have brought home to many business men the grave difficulties in the situation.

American commerce is dependent upon prompt and efficient railway service for its successful operation and the fact that the rail carriers are and must continue to be the backbone of the nation's transportation service is universally recognized.

At the same time, it is realized that there are several current developments which tend to make even more serious the steadily decreasing railway revenues, and which will eventually result in a lowering of operating standards and a corresponding decrease in the quality of service. Among the more important of these is the constantly increasing rate of

taxation, either through the assessment of direct impost, or in a form under which rail carriers must raise new capital to pay a heavy proportion of the cost of highway grade separations and other public improvements. None of these expenditures produces revenues for the railroads.

Various "solutions" present themselves in the emergency, yet objections immediately are apparent:

1. *Advance in Rates.* While rate adjustments in certain directions are necessary to remove obvious inequalities, neither business nor the ultimate consumer is in a position to absorb a substantial advance in the general rate structure even if such advance did not have the effect of diverting more traffic to those non-regulated forms of transport which are already in keen competition with the railroads.

2. *Consolidation of Railroads.* This promises such reduction in operating costs as may be obtained through elimination of service and personnel, the probable amount of which some students of transportation claim has been greatly overestimated. Furthermore, railroad employees assert this is no time to talk of increasing unemployment, and that consolidations cannot be justified by the limited economies which might result. Shippers also raise the question as to the probable effect upon business through the reduction in the number of available routes and the elimination of competitive service. Under the circumstances consolidation would seem to have difficulties ahead.

3. *Government Ownership.* But this means, first, the taxpayers would have to bear all the present railroad tax burdens of over a million dollars a day, as government operations are exempt from taxes, and second, the States and local communities must assume the entire cost of all separation of grades of existing railroad crossings of highways, running into hundreds of millions of dollars. Furthermore, this would leave us, under our form of government, with political management, which usually stifles private initiative, with a constant loss of efficiency and impaired quality of service. The fact that private enterprises must bear the cost of mistakes whereas the government agencies have only to excuse them is axiomatic. Since political operation of business has never been a success as a national dividend producer, can American commerce afford this questionable luxury?

As a suggestion as to what might reasonably be done to eliminate the severe strain on the credit of the rail carriers without disturbing the present system of operation, which is eminently satisfactory to the shipping and traveling public, the following is offered:

First, it is unfair for the railroads to be called upon to participate in the expense of constructing new highways over or under railroad lines. If it were another railroad desiring to cross, the new line would have to pay the entire expense. Why should not the same rule apply to a new highway? The railroads should also receive some relief from the enormous expense which they are called

upon to bear in the elimination of existing grade crossings made necessary because of the extensive use of highways by motor vehicles, many of which are in direct competition with the railroads. Another relief to which the railroads seem entitled is from the constantly growing tax assessments on improvements made for the benefit of the public, including improvements as a result of grade crossing eliminations, etc. If accorded *fair relief* in these particulars, the money now used for such purposes could be devoted to improvements necessary to insure adequate service.

Second, to offset traffic losses to other forms of transportation, the railroads should be relieved from the hard and fast rules of regulatory bodies and be permitted to initiate rates to protect their business without jeopardizing other rates.

Third, it would seem that there should be some fair regulation imposed upon railroad competitors, such as carriers over inland waterways, highways, etc., comparable with those imposed upon the railroads under the Interstate Commerce Act. At present, those other forms of transportation enjoy great advantages over the railroads, upon which, after all, the public must continue to depend for the great bulk of their transportation.

Senate Confirms Appointments

President Hoover has nominated Frank McManamy and Charles D. Mahaffie for reappointment as members of the Interstate Commerce Commission for terms expiring December 31, 1937. Mr. McManamy was reappointed for a new term following the expiration of his present term at the end of this year. Mr. Mahaffie, who has been serving under a recess appointment following the resignation of Thomas F. Woodlock, was also appointed for the remainder of Mr. Woodlock's unexpired term. President Hoover has also nominated Samuel E. Winslow for reappointment as a member of the United States Board of Mediation.

Railroads Spend More

"The fact that so much money has been disbursed this year for intelligent and useful purposes . . . represents responsive co-operation with the Administration. Indeed the record thus far suggests that the railroads have come nearer to realizing the hopes and ambitions for construction and expansion activity in 1930, as voiced by President Hoover in last autumn's emergency conference, than the Federal Government itself. It is another tribute to the resourcefulness, initiative and vigor of private business well directed as contrasted to the red tape, the lack of co-ordination and the limitations of political opportunism encountered in Government undertakings."

—Providence Journal

The Senate committee on interstate commerce voted a favorable report on December 5 on the confirmation by the Senate of the appointments of Mr. McManamy and Mr. Winslow, and these appointments were formally confirmed by the Senate on December 10. Action on Mr. Mahaffie's nomination was withheld at the request of the Minnesota commission, presented through Senator Shipstead, which asked to be heard on his appointment.

The Senate on December 8 confirmed the appointment of W. N. Doak as Secretary of Labor.

Railway Club Meeting

The Railway Club of Pittsburgh will hold its next meeting at Fort Pitt Hotel, Pittsburgh, Pa., on Thursday evening, December 18. T. V. Buckwalter, vice-president of the Timken Roller Bearing Company will present a paper on roller bearings for locomotives and freight cars.

Urge Waterway Appropriation

Governor Weaver of Nebraska, and a delegation from several middle western states, called on President Hoover on December 8 to urge his support for an immediate appropriation of \$8,000,000 to hasten the work of improving the upper Missouri river from Kansas City to Sioux City.

D. L. & W. Electrification

The Delaware, Lackawanna & Western plans to inaugurate electric train operations between Hoboken and Morristown, N. J., on December 18. A test train over this section of the Lackawanna's suburban electrification project will be operated on December 15.

P. R. R. Stockholders Over One-Fourth Million

Another new high record in the number of Pennsylvania stockholders has been reached in the present month, with 232,491 shareholders registered on the company's books. This is an increase of more than 20,000 over last month's record and an advance of 44,444 in the number of P. R. R. shareholders since November of last year.

While much of this increase in Pennsylvania holders is a result of investment buying by the general public, a large part of it is directly traceable to the allotments of stock to employees two years ago on the partial payment plan, installments on which are now being completed.

Bills in Congress

Bills introduced in Congress since the opening of the new session on December 1 include one by Senator Capper, of Kansas proposing to create a federal pipe line commission to regulate the purchase, production, distribution, sale and transportation of natural or artificial gas by pipe-line agencies. Representative Dyer, of Missouri, introduced a bill proposing the establishment of a division in the Department of Commerce to promote travel to and in the United States

and its possessions and to encourage travel by foreigners in the United States. Representative Knutson, of Minnesota, has introduced a joint resolution directing the Interstate Commerce Commission to make an inquiry into the question of whether coastal and intercoastal traffic should be made subject to governmental regulation by the Commission.

Silverton Northern Temporary Suspension

The Silverton Northern, a railroad of 3-ft. gage, whose main line extends between Silverton, Colo., and Eureka, 9 miles, has been authorized by the Public Utilities Commission of Colorado to suspend operation from December 3, 1930, to June 30, 1931. Ninety-eight per cent of its traffic consists of business of the Sunnyside Mining & Milling Co., which has temporarily closed its mill and mines.

P. R. R. Transportation Club Dinner

The first annual dinner of the New York Zone Transportation Club of the Pennsylvania was held at the Hotel Pennsylvania, New York City, on December 8. Among the speakers were General W. W. Atterbury, president of the Pennsylvania and Leonor F. Loree, president of the Delaware & Hudson. George Le Boutillier, vice-president, New York Zone, Pennsylvania, acted as toastmaster. Approximately 1300 attended the dinner.

Brotherhoods Would Compel Use of Stokers and Power Reverse Gears

In formal complaints filed with the Interstate Commerce Commission the Brotherhood of Locomotive Engineers has asked that the railways be required to equip their locomotives with power reverse gears, and the Brotherhood of Locomotive Firemen and Enginemen want mechanical stokers made compulsory. On behalf of the firemen it is asserted that failure to provide stokers endangers the health, safety, comfort and general welfare of the firemen by exposing them to excessive fatigue and to extremes of heat and cold; renders them incapable of keeping a good lookout for signals, and generally subjects the employees and the traveling public to unnecessary peril. On behalf of the enginemen it is stated that the manually-operated reverse gear is excessively heavy and difficult to use and subject to frequent failure.

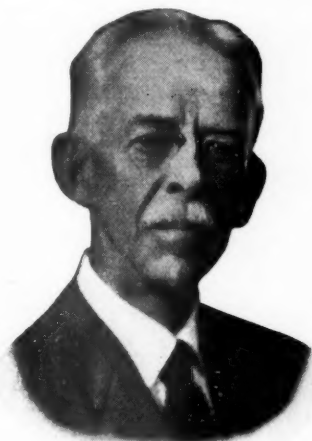
Ohio Valley Shippers' Board

The regular meeting of the Ohio Valley Shippers' Advisory Board, at Louisville, Ky., on December 16, will be concluded by a banquet given by the Transportation Club of Louisville. The speakers at the banquet are to be Fred W. Sargent, president of the Chicago & North Western, who will speak on "Modern Trends in Transportation," and J. H. Beek, executive secretary of the National Industrial Traffic League, who will speak on "The Elements of Prosperity." The program of the board meeting includes two addresses, one by

W. R. Cole, president of the Louisville & Nashville, and another by Dr. Spurgeon Bell, director of business research of the College of Commerce and Administration of Ohio State university. Dr. Bell will talk on "The Trend of Business Conditions."

Francis W. Lane, Railway Age Staff Member, Dies

Francis W. Lane, formerly assistant editor-in-chief of *Railway Age* and for more than 27 years a member of the staff of that magazine, who died on December 3, had completed a varied career of nearly half a century as a teacher, an attorney and a journalist. During his 15 years service as a member of the editorial staff of *Railway Age* from 1892



Francis W. Lane

to 1907, Mr. Lane advanced through the positions of mechanical editor, managing editor and assistant editor-in-chief at Chicago, and resident editor at New York. Much of the progress and development which characterized the publication during the first decade of this century were due to his faithful and intelligent work.

In his earlier years Mr. Lane had a wide acquaintance among engineers, railway officers and manufacturers. He was a gentleman and a scholar, with the genial kindliness of the gentleman and the ideals and temperament of the scholar. A keen observer, he also had the faculty of recording his observations in excellent English. He had a working knowledge of French, Spanish and German and within the past two years had acquired a mastery of Portuguese.

Following his editorial service with *Railway Age*, Mr. Lane became engineering correspondent for the London (England) Times in this country, and in 1911 he was appointed editor of the *Traffic World*. From 1915 to 1918 he was a representative of the Bureau of Railway Economics, returning to the Simmons-Boardman Publishing Company in the latter year as manager of the service department at Chicago, a position he held until his death.

He was born at Ashburnham, Mass., on October 24, 1858. He attended Cushing Academy at Ashburnham and was graduated from Dartmouth College with the degree of A. B. in 1881. For the following two years he was principal of one

of the public schools at Yonkers, N. Y., and then entered the United States Interior Department as a special examiner. In 1887 he located in St. Paul, Minn., as a patent attorney, and he joined the staff of *Railway Age* at Chicago in 1892.

Short Line Association Adopts Resolutions

At a meeting of the executive board of the American Short Line Railroad Association in Washington on December 8 a resolution was adopted expressing opposition to the section of the bus bill as amended in the Senate which would prohibit a railroad from acquiring or operating an existing bus line. "We consider it is the public interest," the resolution stated, "that upon the approval of the commission a railroad corporation should be permitted to substitute motor vehicle service or to operate motor vehicle lines as feeders to such rail lines." The meeting also adopted the following:

"Whereas, Owing to the decline in traffic and the many new forms of competition and there is a crisis in railroad credit; and

"Whereas, The problems of the short lines are largely identical with those of the trunk lines;

"Therefore, Be It Resolved, That the President of this Association be requested to urge the railroad Presidents in conference to promptly take steps to co-operate with each other and this Association for the purpose of meeting such emergency and to inform the public of the danger of the present situation."

Southeast Shippers' Board

An aggregate volume of business for the first three months of 1931 practically equalling that of the first quarter of this year was predicted in reports read at the Southeast Shippers' Advisory Board meeting held at Nashville, Tenn., on December 5. Shipments of brick, clay and products, also iron and steel equalling those of this year are anticipated, while in lumber and forest products a 10 per cent reduction is expected. An increase is expected in cement and crushed stone, sand, gravel and slag.

The cotton committee estimates a decrease of 10 per cent, but the textile merchants expect their business will equal 1930's first quarter. Cotton seed and products will show an increase of six per cent. Coal and coke will be about 20 per cent less due to curtailed industrial activity, coupled with increase in natural gas usage. Furniture demand is expected to continue at about 20 per cent under 1930 level. In the naval stores industry a four per cent decrease is predicted, while manufacturers of pulp, paper and products look for a seven per cent increase. Petroleum and products shipments should show an increase of four per cent.

Fertilizer and materials will be about six per cent under 1930. The movement of citrus fruits should run 32 per cent better than in the first quarter of 1930. Shipments of grain and grain products should reach the 1930 level, the de-

(Continued on page 1296)

Revenues and Expenses of Railways

MONTH OF OCTOBER AND TEN MONTHS OF CALENDAR YEAR 1930

Name of road	Av. mileage operated during period.	Operating revenues				Maintenance of way and equipment			Operating expenses			Net from railway operation.	Operating income (or loss).	Net operating income.	Net operating income, 1929.
		Freight.	Passenger.	Total.	(Inc. misc.)	Structures.	Equip-ment.	Traffic.	Trans-portion.	Total.	Operating ratio.				
Akron, Canton & Youngstown.....	Oct. 171	\$211,726	\$92	\$211,818		\$33,515	\$23,331	\$13,660	\$66,579	\$17,236	70.1	\$65,888	\$88,802	\$68,499	\$69,112
10 mos. 171		2,312,725	1,113	2,313,838		380,985	228,621	141,573	668,901	1,584,135	65.9	726,163	1,584,135	498,426	968,849
Atchison, Topeka & Santa Fe.....	Oct. 1,629	14,374,558	1,852,971	17,647,529		1,872,467	3,050,372	403,177	4,556,807	7,314,598	58.6	5,253,191	5,253,191	5,533,648	7,860,131
10 mos. 9,629		118,320,667	24,629,417	157,041,723		24,237,128	31,556,206	4,140,371	46,589,832	4,900,097	70.5	46,293,084	32,374,797	31,949,427	50,564,603
Gulf, Colorado & Santa Fe.....	Oct. 1,976	2,202,023	134,387	2,476,037		256,985	326,400	57,904	651,188	1,347,708	54.4	1,128,728	1,013,179	925,522	1,177,247
10 mos. 1,955		19,141,094	1,397,883	21,791,053		3,906,526	4,347,416	572,172	6,628,792	749,661	73.8	5,713,261	4,731,154	3,391,820	4,292,638
Panhandle & Santa Fe.....	Oct. 1,634	1,257,047	99,770	1,438,104		136,976	248,673	20,913	397,334	37,149	57.7	608,234	554,295	523,811	570,280
10 mos. 1,595		11,705,270	850,607	13,354,991		2,888,826	2,678,816	199,798	3,725,948	394,316	73.5	3,541,894	3,121,649	1,949,982	3,712,609
Atlanta & West Point.....	Oct. 93	138,171	33,650	199,740		29,189	35,786	11,024	77,148	12,306	84.9	30,120	17,363	8,232	48,544
10 mos. 93		1,342,660	390,802	2,001,562		268,785	366,372	119,734	779,320	1,222,038	86.1	279,057	152,006	37,343	180,239
Western of Alabama.....	Oct. 133	151,677	36,389	209,943		18,058	40,261	11,478	72,994	12,828	76.0	50,118	32,382	38,056	82,422
10 mos. 133		1,510,040	416,973	2,141,202		271,860	438,442	122,934	759,568	1,28,584	82.1	382,523	239,063	282,435	355,681
Atlanta, Birmingham & Coast.....	Oct. 639	292,908	16,820	349,746		84,828	75,684	25,573	141,025	19,739	79.9	86,160	68,660	66,662	15,517
10 mos. 639		2,938,576	175,333	3,493,388		824,360	763,112	282,636	1,472,430	200,248	80.2	475,163	286,925	260,190	378,508
Atlantic Coast Line.....	Oct. 5,159	3,791,902	461,239	4,682,316		871,041	1,065,459	151,700	1,806,524	1,711,364	87.4	5,914,643	4,834,405	4,480,707	5,256,490
10 mos. 5,156		38,377,250	9,282,889	52,623,963		8,337,363	10,459,638	1,679,219	18,920,294	1,753,940	79.2	10,928,028	6,280,900	5,931,155	11,414,490
Charleston & Western Carolina.....	Oct. 342	233,255	5,688	268,243		35,167	41,091	6,257	91,510	182,083	67.9	86,160	68,660	66,662	15,517
10 mos. 342		2,236,508	76,913	2,399,160		507,129	380,201	72,799	889,729	74,130	80.2	475,163	286,925	260,190	378,508
Baltimore & Ohio.....	Oct. 5,658	15,446,066	1,501,005	18,203,775		1,650,723	3,265,626	480,828	6,149,809	6,79,789	68.1	5,803,535	4,834,405	4,480,707	5,256,490
10 mos. 5,658		150,023,128	15,893,886	178,061,495		19,836,326	36,197,378	5,287,088	61,643,294	6,843,338	73.9	46,481,566	37,345,408	34,801,539	43,514,963
Baltimore & Ohio Chic. Term.....	Oct. 85	.....	357,777	48,057		34,399	39,720	2,058	156,819	14,427	72.6	98,065	44,471	159,565	141,445
10 mos. 85		.....	3,293,956	496,720		394,717	23,976	1,639,827	1,84,739	2,793,901	84.8	500,055	45,842	1,063,174	1,226,961
Staten Island Rapid Transit.....	Oct. 23	79,304	1,116,855	2,091,833		16,139	14,213	1,969	100,143	16,622	72.5	56,545	38,001	29,723	40,227
10 mos. 23		679,812	11,623,223	2,091,833		178,160	159,851	21,785	1,011,296	1,70,787	73.7	59,954	375,393	281,347	328,335
Bangor & Aroostook.....	Oct. 619	725,294	29,995	787,165		111,807	110,904	6,224	163,064	27,510	53.4	365,383	291,843	303,099	355,458
10 mos. 619		6,311,471	476,602	7,095,580		1,200,876	1,187,660	59,986	1,699,299	2,06,295	62.1	2,697,433	2,087,327	2,099,465	1,972,334
Belt Ry. Co. of Chicago.....	Oct. 57	.....	624,742	49,637		68,806	3,563	3,563	257,262	10,785	64.1	234,029	169,301	146,264	152,848
10 mos. 57		.....	5,857,944	532,266		612,709	40,938	40,938	2,761,387	115,664	69.4	1,790,980	1,251,248	1,516,562	1,508,339
Besemer & Lake Erie.....	Oct. 227	1,495,266	3,131	1,513,658		70,903	345,770	14,229	304,097	35,571	51.0	741,523	635,622	645,229	900,173
10 mos. 227		13,187,993	49,116	13,408,359		1,127,683	3,223,945	132,881	2,890,338	362,469	58.8	5,522,578	4,706,308	4,682,226	6,986,773
Bingham & Garfield.....	Oct. 33	31,630	.....	31,630		8,351	1,590	7,718	7,718	4,007	93.1	2,262	4,333	12,660	16,557
10 mos. 33		305,304	.....	314,359		66,847	69,970	15,630	82,257	47,918	90.3	30,612	28,849	136,960	209,211
Boston & Maine.....	Oct. 2,090	4,165,335	1,129,335	6,092,187		875,916	790,908	86,675	2,135,055	227,544	68.0	1,952,701	1,591,281	1,345,077	1,203,842
10 mos. 2,090		38,441,968	12,194,009	50,635,977		9,986,543	8,710,977	911,163	21,087,547	2,199,903	73.5	15,522,578	12,560,459	10,393,866	11,312,177
Brooklyn Eastern Dist Term.....	Oct. 11	1,174,488	.....	1,174,488		13,848	11,931	258	38,139	3,504	58.3	49,821	43,049	43,049	42,427
10 mos. 11		1,006,961	.....	1,121,254		100,793	143,628	4,343	364,860	56,229	59.7	451,401	383,131	383,131	396,427
Buffalo & Susquehanna.....	Oct. 253	144,677	396	160,525		21,271	44,473	2,214	45,839	7,308	75.4	39,420	37,345	48,099	43,245
10 mos. 253		1,390,776	6,645	1,523,626		279,533	434,288	20,566	444,642	82,111	82.8	262,486	253,596	369,588	280,754
Buffalo, Rochester & Pittsburgh.....	Oct. 601	1,298,622	52,791	1,390,827		197,441	311,484	36,739	507,465	40,508	78.7	296,754	266,651	267,747	270,149
10 mos. 601		12,027,006	552,463	13,037,512		1,707,799	3,423,458	370,415	5,010,848	439,500	84.1	2,069,813	1,718,911	1,842,154	2,513,083
Burlington-Rock Island.....	Oct. 367	253,403	3,642	264,604		68,860	19,467	7,199	80,505	12,338	70.1	79,239	71,105	27,148	13,841
10 mos. 367		1,675,434	46,028	1,799,300		1,063,200	294,159	66,575	746,241	128,252	121.4	384,299	464,176	760,765	77,484
Canadian Pacific Lines in Maine.....	Oct. 233	165,380	18,389	197,397		36,237	53,659	7,937	82,328	3,717	93.1	13,519	9,019	7,518	17,366
10 mos. 233		1,644,982	296,610	2,087,267		492,841	505,643	77,893	914,423	42,797	97.4	53,670	81,330	268,653	223,112
Canadian Pacific Lines in Vermont.....	Oct. 85	82,210	23,889	127,528		25,722	29,023	2,060	83,194	2,132	111.3	14,603	18,723	50,348	23,778
10 mos. 85		992,095	320,876	1,551,387		246,940	322,975	20,451	875,639	25,525	96.1	59,944	19,644	288,310	204,564
Central of Georgia.....	Oct. 1,944	1,496,270	164,203	1,809,107		124,917	215,545	71,323	675,262	79,290	64.8	636,068	488,190	493,409	500,770
10 mos. 1,944		14,006,070	2,374,669	18,141,086		1,948,134	3,059,132	688,412	7,203,358	823,052	76.2	4,309,957	3,094,641	3,157,519	3,797,105
Central New Jersey.....	Oct. 692	3,861,873	637,031	4,794,436		432,158	933,268	50,104	1,655,440	130,804	67.3	1,566,832	1,044,663	939,660	1,270,113
10 mos. 692		34,299,692	7,275,622	44,331,350		4,306,594	9,249,847	605,410	16,816,477	3,227,604	73.4	11,788,162	7,591,466	6,400,983	7,903,032
Central Vermont.....	Oct. 462	505,878	863,080	635,096		91,105	1,038,662	17,286	255,155	25,541	78.7	135,120	118,684	130,841	168,137
10 mos. 465		4,966,583	863,080	6,469,899		1,156,583	1,038,662	184,045	2,701,331	251,909	82.7	1,116,460	955,658	1,122,691	1,621,003
Chesapeake & Ohio.....	Oct. 3,116	11,666,124	387,326	12,540,173		1,619,684	1,972,538	160,146	3,103,028	372,444	57.8	5,290,398	4,362,871	4,456,713	4,435,464
10 mos. 3,116		106,381,158	4,753,458	116,136,541		15,988,156	22,948,865	1,681,766	29,366,169	3,54,348	63.5	42,371,572	33,906,911	34,471,113	36,854,632
Chicago & Alton.....	Oct. 1,028	1,608,926	334,787	2,172,177		356,690	440,433	78,436	831,736	55,892	80.5	423,285	296,044	90,559	31,815
10 mos. 1,028		15,012,787	3,719,771	20,868,324		3,064,174	4,696,861	777,420	7,975,810	650,860	82.9	3,576,025	2,424,695	522,017	3,028,425
Chicago & Eastern Illinois.....	Oct. 946	13,599,979	174,337	16,888,265		1,522,321	388,700	78,409	667,020	66,688	80.9	321,842	166,706	11,226	218,850
10 mos. 946		13,227,769	2,251,321	16,978,905		2,026,617	3,864,263	809,850	7,028,348	705,397	85.6	2,439,708	1,069,991	540,149	2,057,791

Revenues and Expenses of Railways

MONTH OF OCTOBER AND TEN MONTHS OF CALENDAR YEAR 1930--CONTINUED

Name of road	Av. mileage operated during period	Operating revenues			Maintenance of way and equip. structures.			Operating expenses			Operating income (or loss).	Net operating income, 1929.	
		Freight.	Passenger.	Total.	Way and equip. structures.	Traffic.	Transportation.	General.	Total.				
Chicago & Illinois Midland.....	Oct. 131	\$297,817	\$3,118	\$312,365	\$38,896	\$81,339	\$81,592	\$20,282	\$218,847	\$93,518	\$85,183	\$72,903	\$55,885
Chicago & Illinois Midland.....	10 mos. 131	2,424,483	45,515	2,572,207	295,632	730,097	730,097	2,423,263	2,572,207	730,097	588,041	483,019	419,191
Chicago & North Western.....	Oct. 8,458	9,099,569	1,349,899	11,726,684	1,641,083	1,470,270	1,786,860	3,833,853	7,992,880	3,733,804	2,997,915	2,666,474	3,442,758
Chicago & North Western.....	10 mos. 8,458	83,363,003	16,696,651	112,476,043	16,297,838	21,402,335	42,346,301	3,855,622	86,446,840	26,029,203	18,430,042	15,994,251	25,220,588
Chicago, Burlington & Quincy.....	Oct. 9,324	10,692,710	1,086,006	12,959,230	1,677,589	1,712,501	4,054,471	368,672	8,127,247	4,381,983	3,755,019	3,477,482	4,531,386
Chicago, Burlington & Quincy.....	10 mos. 9,324	94,097,536	13,237,616	119,885,835	17,832,868	17,867,240	39,397,363	3,714,067	82,813,216	37,072,619	27,386,706	24,833,583	31,510,846
Chicago Great Western.....	Oct. 1,495	1,934,461	139,233	2,215,533	334,889	190,266	762,248	\$5,634	1,427,170	788,363	684,125	456,024	454,971
Chicago Great Western.....	10 mos. 1,495	16,181,984	1,705,305	19,352,694	2,874,463	2,448,743	842,745	540,113	14,182,498	5,170,196	4,274,545	2,433,636	3,336,749
Chicago, Indianapolis & Louisville.....	Oct. 645	1,035,231	107,599	1,259,286	161,304	263,229	41,384	34,128	967,171	292,115	219,025	96,665	304,207
Chicago, Indianapolis & Louisville.....	10 mos. 647	10,138,460	1,278,553	12,643,041	1,473,769	2,617,931	389,532	356,188	9,581,480	3,061,633	2,272,177	1,043,710	2,286,877
Chicago, Mil., St. Paul & Pacific.....	Oct. 11,335	10,937,873	887,065	13,043,831	2,006,573	2,345,984	4,501,066	369,999	9,563,612	3,468,219	2,665,443	2,165,506	3,535,470
Chicago, Mil., St. Paul & Pacific.....	10 mos. 11,311	99,412,324	10,852,160	122,297,045	19,871,176	23,814,759	3,235,705	3,735,129	95,936,589	26,360,456	18,273,556	14,340,804	23,104,477
Chicago River & Indiana.....	Oct. 20	.....	.....	542,542	53,000	178,432	18,066	20,325	293,563	248,979	228,668	302,053	370,381
Chicago River & Indiana.....	10 mos. 20	.....	.....	5,209,791	490,000	448,000	15,062	185,066	2,960,735	2,429,591	1,933,873	2,654,814	3,088,741
Chicago, Rock Island & Pacific.....	Oct. 7,592	8,005,458	1,062,586	9,977,188	1,058,995	1,615,175	252,579	329,696	6,841,849	3,135,339	2,509,492	2,160,631	2,952,929
Chicago, Rock Island & Pacific.....	10 mos. 7,592	78,166,686	12,495,677	100,027,828	12,730,725	17,596,349	2,509,544	3,425,663	73,734,134	26,293,694	20,403,926	16,017,958	18,824,268
Chicago, Rock Island & Gulf.....	Oct. 625	432,214	51,873	527,195	76,648	41,895	20,262	21,313	342,508	184,677	159,999	136,773	316,510
Chicago, Rock Island & Gulf.....	10 mos. 584	4,671,049	563,958	5,676,296	797,195	516,959	211,885	3,693,592	4,145,555	1,982,701	1,746,887	1,366,045	2,326,484
Chic., St. Paul, Minn. & Omaha.....	Oct. 1,736	1,728,545	211,491	2,111,322	358,083	401,785	39,057	87,462	1,815,115	296,210	186,448	98,585	479,061
Chic., St. Paul, Minn. & Omaha.....	10 mos. 1,741	16,593,278	2,784,917	21,070,117	3,156,357	3,966,066	409,791	857,589	17,212,435	3,857,682	2,767,771	1,962,205	3,087,196
Clinchfield Railroad.....	Oct. 309	485,281	6,820	505,202	41,707	119,559	20,600	19,645	327,642	177,560	127,514	185,221	311,557
Clinchfield Railroad.....	10 mos. 309	4,868,625	93,574	5,065,604	573,974	1,263,618	211,829	180,542	3,352,276	1,713,328	1,038,113	1,610,300	2,280,107
Colorado & Southern.....	Oct. 1,038	863,697	57,555	1,003,685	137,318	163,656	14,139	39,685	671,452	332,233	262,194	232,445	422,765
Colorado & Southern.....	10 mos. 1,038	7,021,741	719,385	8,513,002	1,311,995	1,657,288	160,218	419,326	6,613,737	1,899,265	1,198,491	964,458	1,176,537
Ft. Worth & Denver City.....	Oct. 696	641,576	101,145	802,914	105,381	142,639	19,142	39,113	565,078	237,836	202,706	224,402	431,996
Ft. Worth & Denver City.....	10 mos. 696	6,359,481	1,107,486	8,075,113	1,416,786	1,416,785	212,455	390,988	5,707,956	2,367,157	1,916,633	1,801,368	2,871,541
Wichita Valley.....	Oct. 270	85,193	2,702	92,415	4,122	28	30,048	1,964	65,224	23,191	19,581	663	59,004
Wichita Valley.....	10 mos. 271	634,498	27,565	708,909	247,934	535,46	384	17,590	610,713	96,196	26,680	—158,498	219,333
Columbus & Greenville.....	Oct. 167	126,935	8,198	144,872	37,758	22,499	4,154	13,326	130,609	14,263	10,250	6,687	71,199
Columbus & Greenville.....	10 mos. 167	1,140,695	124,529	1,345,157	345,878	201,114	42,401	119,314	1,188,928	155,229	116,713	92,214	184,923
Conemaugh & Black Lick.....	Oct. 20	61,804	.....	103,889	14,470	20,027	53,389	3,400	93,860	91,2	10,009	10,598	54,022
Conemaugh & Black Lick.....	10 mos. 20	703,897	.....	1,256,752	129,427	207,582	8,147	708,398	1,089,961	160,791	156,791	182,376	365,218
Delaware & Hudson.....	Oct. 881	3,220,780	181,288	3,596,106	509,456	742,817	56,856	148,751	2,618,551	977,555	854,555	906,899	1,273,876
Delaware & Hudson.....	10 mos. 881	27,583,053	2,405,100	32,098,916	4,582,350	7,436,573	584,023	1,577,502	25,550,421	6,546,293	5,311,728	5,406,415	6,937,867
Delaware, Lackawanna & Western.....	Oct. 998	4,878,612	782,502	6,413,098	524,578	1,125,231	140,846	1,911,928	4,494,332	1,915,266	1,346,068	1,376,773	1,697,504
Delaware, Lackawanna & Western.....	10 mos. 998	42,876,269	8,594,185	58,808,835	5,784,720	10,829,693	1,452,268	23,669,275	44,233,993	14,576,646	9,477,561	9,627,750	14,060,234
Denver & Rio Grande Western.....	Oct. 2,524	3,071,465	180,642	3,452,915	426,018	450,148	65,360	94,856	2,037,478	1,415,437	1,215,341	1,162,747	1,174,152
Denver & Rio Grande Western.....	10 mos. 2,524	20,777,576	2,314,530	24,942,333	3,397,336	4,680,202	604,516	911,391	17,421,757	7,520,576	5,747,037	5,854,358	7,214,422
Denver & Salt Lake.....	Oct. 232	378,676	7,823	402,357	29,554	39,809	2,172	10,881	133,725	268,632	251,632	235,691	209,968
Denver & Salt Lake.....	10 mos. 232	2,286,198	128,659	2,597,351	250,754	553,463	22,794	148,109	1,705,633	891,158	735,416	807,714	1,213,689
Detroit & Mackinac.....	Oct. 242	93,094	4,655	109,039	19,285	13,008	1,834	2,873	69,003	40,036	31,463	30,478	34,341
Detroit & Mackinac.....	10 mos. 251	782,636	74,773	949,956	267,780	169,117	21,226	61,378	831,513	117,543	43,011	39,491	281,169
Detroit & Toledo Shore Line.....	Oct. 50	277,330	.....	283,940	40,340	21,436	7,211	30,329	153,663	124,551	108,888	53,224	40,251
Detroit & Toledo Shore Line.....	10 mos. 50	3,099,298	.....	3,147,593	396,203	309,919	75,608	111,949	1,702,964	1,443,298	1,211,323	592,926	725,709
Detroit Terminal.....	Oct. 19	.....	.....	97,412	12,809	10,174	1	3,577	78,614	18,798	3,803	4,995	26,181
Detroit Terminal.....	10 mos. 19	.....	.....	1,202,405	176,591	118,951	84	44,003	954,389	247,816	95,192	104,281	598,616
Detroit, Toledo & Ironton.....	Oct. 496	591,601	1,326	617,355	96,866	106,974	13,226	30,329	464,567	152,788	136,049	117,749	327,954
Detroit, Toledo & Ironton.....	10 mos. 500	8,888,902	16,708	9,087,629	1,219,728	1,122,868	133,958	339,895	5,263,805	3,823,824	3,298,287	2,982,662	4,463,312
Duluth, Missabe & Northern.....	Oct. 568	1,975,826	4,840	2,254,301	182,862	292,678	3,306	39,088	998,962	1,255,339	1,050,284	1,048,553	1,730,627
Duluth, Missabe & Northern.....	10 mos. 567	17,791,677	64,489	20,219,449	2,559,234	3,058,534	40,873	430,528	9,949,953	10,269,496	8,322,475	8,342,318	13,623,318
Duluth, Missabe & Northern.....	Oct. 178	113,734	10,672	136,595	428,786	44,172	4,314	7,796	148,706	—12,111	—18,568	—6,405	20,919
Duluth, Winnipeg & Pacific.....	Oct. 178	1,317,726	111,387	1,526,734	312,166	372,166	50,052	75,182	1,493,028	32,111	—44,408	—6,006	246,912
Duluth, Winnipeg & Pacific.....	10 mos. 178	13,177,266	1,317,726	16,594,992	3,121,666	3,721,666	500,052	751,824	14,930,288	1,211,323	1,050,284	1,048,553	1,730,627
Elgin, Joliet & Eastern.....	Oct. 452	1,451,690	27	1,618,876	220,510	333,659	16,567	53,010	1,274,872	344,004	244,217	118,362	635,770
Elgin, Joliet & Eastern.....	10 mos. 452	17,142,451	2,471	18,937,792	2,263,571	3,207,447	160,067	541,078	13,357,527	5,576,265	4,415,045	2,799,949	5,343,121
Erie Railroad.....	Oct. 2,046	7,378,692	686,881	8,765,121	1,659,425	1,223,149	176,042	301,238	6,958,634	2,166,487	1,780,334	1,552,113	2,340,443
Erie Railroad.....	10 mos. 2,046	66,583,439	7,986,994	81,572,166	10,333,178	18,108,489	1,781,563	2,997,688	64,954,957	16,617,209	12,642,429	11,716,045	16,838,708
Chicago & Erie.....	Oct. 269	1,166,453	44,532	1,303,592	183,041	151,857	29,050	42,131	758,366	545,226	535,215	210,747	313,946
Chicago & Erie.....	10 mos. 269	10,164,676	522,801	11,514,502	1,447,908	1,857,727	294,634	433,189	6,994,497	4,547,007	3,993,447	1,236,109	2,267,739

Revenues and Expenses of Railways

MONTH OF OCTOBER AND TEN MONTHS OF CALENDAR YEAR 1930—CONTINUED

Name of road	Av. mileage operated during period	Operating revenues				Operating expenses				Net from railway operation	Operating income (or loss)	Net ry. operating income, 1929
		Freight	Passenger (inc. misc.)	Total	Maintenance of way and structures	Traffic	Transportation	General	Total			
New Jersey & New York.....Oct.	45	\$23,135	\$88,345	\$111,480	\$17,941	\$1,696	\$61,189	\$3,363	\$104,964	\$10,758	\$94,206	\$15,554
10 mos.....Oct.	45	227,952	919,400	1,147,352	16,030	16,030	621,314	37,205	1,051,171	141,759	90,912	\$22,489
N. Y., Susquehanna & Western.....Oct.	131	383,570	36,498	420,068	71,751	4,976	164,866	11,519	298,970	163,237	135,733	224,626
10 mos.....Oct.	131	3,196,066	393,153	3,589,219	515,681	48,839	1,670,256	118,378	2,812,043	1,132,388	816,558	115,908
Florida East Coast.....Oct.	863	392,488	108,630	501,118	135,045	28,845	239,945	46,941	620,984	105,0	105,0	145,884
10 mos.....Oct.	863	5,474,970	9,955,435	15,430,405	1,532,910	1,891,998	3,034,748	453,618	13,878,463	1,386,881	1,386,881	1,568,997
Fort Smith & Western.....Oct.	249	138,699	5,405	144,104	28,120	26,011	39,759	6,237	100,740	50,220	50,220	51,894
10 mos.....Oct.	249	997,215	65,737	1,062,952	218,675	55,316	388,275	64,579	939,882	189,564	148,111	42,833
Galveston Wharf.....Oct.	13	.....	.....	.....	38,762	7,105	30,802	6,875	102,930	88,337	65,047	65,205
10 mos.....Oct.	13	.....	.....	.....	362,992	58,652	294,986	66,120	987,034	545,632	311,042	313,958
Georgia R. R.....Oct.	328	370,261	31,062	401,323	42,729	71,039	184,107	22,710	342,010	80,138	80,138	98,929
10 mos.....Oct.	328	3,257,226	411,485	3,668,711	454,362	223,185	1,723,331	227,881	3,388,188	582,578	491,622	632,734
Georgia & Florida.....Oct.	469	141,948	3,651	145,600	39,034	10,493	51,225	8,010	133,228	87,6	87,6	10,304
10 mos.....Oct.	469	1,331,254	54,645	1,385,899	331,806	102,985	520,737	81,400	1,262,711	194,751	107,624	150,535
Grand Trunk Western.....Oct.	1,019	1,716,362	133,682	1,850,044	323,150	63,459	862,259	130,021	1,684,161	320,667	173,270	402,413
10 mos.....Oct.	1,019	15,517,887	1,659,816	17,177,703	3,439,944	704,629	9,392,928	1,061,800	18,964,858	2,329,099	484,125	6,193,186
Atlantic & St. Lawrence.....Oct.	166	136,235	18,214	154,449	40,973	5,402	70,288	7,403	166,260	96,7	96,7	116,120
10 mos.....Oct.	166	1,279,576	209,196	1,488,772	353,456	59,395	870,040	88,105	1,811,340	182,039	28,039	768,786
Great Northern.....Oct.	8,366	10,935,687	603,304	11,539,000	1,481,337	228,499	3,214,764	236,978	5,902,081	5,697,151	5,188,282	5,002,549
10 mos.....Oct.	8,366	73,743,061	7,761,133	81,504,194	12,193,394	2,459,880	28,620,854	2,399,828	62,144,714	28,098,251	20,548,017	27,564,789
Green Bay & Western.....Oct.	234	153,960	1,806	155,766	33,262	6,138	56,768	3,221	123,162	39,519	31,519	27,786
10 mos.....Oct.	234	1,404,411	27,447	1,431,858	222,038	62,235	544,493	29,453	1,118,824	368,980	279,905	33,903
Gulf & Ship Island.....Oct.	307	180,598	19,208	199,806	40,012	5,366	82,511	6,390	158,835	59,813	25,714	7,000
10 mos.....Oct.	307	1,746,824	281,622	2,028,446	466,930	48,220	903,309	67,303	1,862,667	423,093	95,681	42,143
Gulf, Mobile & Northern.....Oct.	733	499,403	16,394	515,797	71,783	26,841	163,740	23,747	359,332	177,968	141,231	103,274
10 mos.....Oct.	733	4,622,835	16,206	4,639,041	876,988	297,189	1,647,513	254,762	3,900,078	1,156,660	846,595	537,071
Illinois Central.....Oct.	5,018	8,946,194	1,192,575	10,138,769	890,298	252,835	3,923,609	3,923,609	2,950,720	3,719,092	2,903,930	2,564,296
10 mos.....Oct.	5,018	83,758,549	14,292,214	98,050,763	12,038,202	2,648,285	39,771,062	3,617,705	82,418,603	17,402,193	16,906,317	21,033,656
Yazoo & Mississippi Valley.....Oct.	1,705	1,863,772	164,227	2,028,000	217,801	47,166	727,662	64,672	1,296,039	871,032	703,899	591,779
10 mos.....Oct.	1,705	16,330,726	2,223,830	18,554,556	2,856,375	452,684	7,650,334	64,941	14,931,613	4,910,643	3,229,263	2,173,354
Illinois Central System.....Oct.	6,724	10,809,966	1,356,802	12,166,768	1,108,108	300,001	4,651,271	4,261,914	8,570,665	4,590,124	3,654,619	3,495,709
10 mos.....Oct.	6,724	100,159,354	16,532,305	116,691,659	14,894,577	3,100,969	47,456,084	4,267,914	97,407,773	29,383,812	20,634,900	19,083,115
Illinois Terminal.....Oct.	554	553,358	105,805	659,163	96,271	20,756	221,941	41,047	472,274	219,398	185,565	148,701
10 mos.....Oct.	554	4,877,952	1,181,685	6,059,637	806,646	194,456	2,172,532	418,361	4,407,653	1,963,185	1,660,552	1,242,571
Kansas City Southern.....Oct.	784	1,160,330	47,277	1,207,607	159,829	63,888	393,233	75,705	941,791	416,526	335,805	310,192
10 mos.....Oct.	784	12,371,952	682,154	13,054,106	1,682,137	635,247	4,292,117	786,092	9,874,808	4,609,408	3,582,937	3,882,473
Texarkana & Ft. Smith.....Oct.	99	178,857	3,837	182,694	21,169	8,455	52,076	12,697	110,877	102,703	102,364	51,100
10 mos.....Oct.	99	1,893,718	52,100	1,945,818	266,311	88,800	556,841	125,340	1,294,455	892,233	796,328	438,736
Kansas, Oklahoma & Gulf.....Oct.	326	271,500	1,593	273,093	25,279	14,898	62,476	11,236	142,486	136,521	112,546	90,551
10 mos.....Oct.	326	2,540,183	18,891	2,559,074	289,439	156,616	627,417	113,355	1,437,724	1,172,645	954,336	747,118
Lake Superior & Ishpeming.....Oct.	160	194,670	393	195,063	30,208	558	48,885	6,681	121,927	105,402	78,507	74,940
10 mos.....Oct.	160	1,800,824	7,797	1,808,621	359,870	6,063	456,902	64,676	1,170,413	920,228	617,312	586,072
Lake Terminal.....Oct.	12	.....	.....	.....	19,001	.....	45,900	1,829	79,410	12,175	7,667	16,875
10 mos.....Oct.	12	.....	.....	.....	147,290	.....	429,368	23,179	721,354	143,796	98,240	54,235
Lehigh & Hudson River.....Oct.	96	192,914	1,063	193,977	22,200	3,232	68,480	9,875	136,808	66,921	47,556	29,477
10 mos.....Oct.	96	1,791,660	10,630	1,802,290	267,622	34,412	676,352	100,774	1,352,089	388,927	388,927	386,880
Lehigh & New England.....Oct.	216	555,228	226	555,454	86,435	5,336	155,477	37,622	338,833	202,909	177,411	166,660
10 mos.....Oct.	216	4,197,084	8,751	4,205,835	527,732	60,707	1,477,027	266,395	3,182,320	1,081,117	938,024	868,514
Lehigh Valley.....Oct.	1,361	4,894,270	375,117	5,269,387	1,072,946	133,574	2,137,461	140,599	4,017,567	1,298,309	1,206,123	1,751,570
10 mos.....Oct.	1,361	42,768,705	4,730,197	47,500,902	5,007,922	1,432,296	21,273,244	1,428,549	40,507,336	8,100,166	7,092,815	11,453,339
Louisiana & Arkansas.....Oct.	608	567,492	15,294	582,786	79,435	21,849	161,099	30,116	242,018	185,801	157,644	192,761
10 mos.....Oct.	608	5,585,046	192,785	5,777,831	907,666	221,076	1,772,179	265,743	4,097,179	1,950,055	1,480,066	1,085,002
Louisiana, Arkansas & Texas.....Oct.	202	89,022	1,832	90,854	20,176	2,687	30,182	4,819	67,943	26,386	22,376	12,610
10 mos.....Oct.	202	727,401	20,313	747,714	222,212	33,620	346,840	52,909	799,617	21,036	61,244	172,985
Louisville & Nashville.....Oct.	5,251	8,073,601	756,013	8,829,614	1,221,293	203,729	3,346,569	363,058	7,111,538	2,346,929	1,761,786	2,500,227
10 mos.....Oct.	5,249	79,200,675	9,985,684	89,186,359	14,735,082	2,410,536	34,427,215	3,696,606	79,141,159	16,248,384	10,905,327	17,244,005
Maine Central.....Oct.	1,121	1,324,585	172,128	1,496,713	244,983	339,592	581,106	51,788	1,231,557	409,813	312,297	283,032
10 mos.....Oct.	1,121	12,424,496	2,350,425	14,774,921	2,482,930	172,857	5,986,537	503,931	12,290,011	3,951,972	2,981,226	2,565,662

Net ry. operating income, 1929

Revenues and Expenses of Railways

REVENUES AND EXPENDITURES

MONTH OF OCTOBER AND TEN MONTHS OF CALENDAR YEAR 1930—CONTINUED									
Name of road	Av. mileage operated during period.	Operating revenues—			Operating expenses—			Net from railway operation.	Net operating income, 1929.
		Freight.	Passenger. (inc. misc.)	Total.	Traffic.	Transportation.	General.		
Midland Valley	Oct. 563	2,421,121	\$4,102	\$304,562	\$5,803	\$65,601	\$12,455	\$152,968	\$114,993
.....	10 mos. 363	2,471,430	57,940	2,609,661	55,709	263,509	126,921	1,495,760	892,249
.....	10 mos. 697	1,120,997	38,271	1,222,683	35,551	506,121	45,268	952,723	231,441
Minneapolis & St. Louis	Oct. 1,637	9,758,275	492,851	10,885,516	375,867	4,790,066	443,609	9,177,461	1,818,282
.....	10 mos. 1,627	9,758,275	492,851	10,885,516	375,867	4,790,066	443,609	9,177,461	1,818,282
Minneapolis, St. Paul & S. Marie	Oct. 4,374	3,292,865	222,687	3,791,931	72,600	1,260,377	125,983	2,387,630	1,244,638
.....	10 mos. 4,393	2,871,633	298,102	3,459,174	806,307	1,248,119	1,254,351	2,673,539	7,723,235
.....	10 mos. 373	2,871,633	298,102	3,459,174	806,307	1,248,119	1,254,351	2,673,539	7,723,235
Duluth, South Shore & Atlantic	Oct. 573	2,685,560	348,651	3,309,672	83,235	1,381,095	106,060	2,845,369	402,931
.....	10 mos. 573	2,685,560	348,651	3,309,672	83,235	1,381,095	106,060	2,845,369	402,931
Spokane International	Oct. 165	83,455	4,586	94,439	3,464	29,274	5,683	64,365	28,421
.....	10 mos. 165	83,455	4,586	94,439	3,464	29,274	5,683	64,365	28,421
.....	10 mos. 165	83,455	4,586	94,439	3,464	29,274	5,683	64,365	28,421
Mississippi Central	Oct. 150	1,048,358	48,921	1,135,784	99,183	326,743	81,864	942,809	114,019
.....	10 mos. 150	1,048,358	48,921	1,135,784	99,183	326,743	81,864	942,809	114,019
Missouri & North Arkansas	Oct. 364	135,545	4,230	148,312	10,538	54,332	9,027	126,933	18,801
.....	10 mos. 364	128,725	59,922	1,423,129	98,770	537,368	81,643	1,218,223	43,290
.....	10 mos. 202	145,965	1,020	150,072	3,600	41,718	4,527	112,983	204,405
Missouri Illinois	Oct. 202	1,512,818	15,308	1,559,244	34,708	457,603	65,625	1,125,012	362,719
.....	10 mos. 202	1,512,818	15,308	1,559,244	34,708	457,603	65,625	1,125,012	362,719
Missouri-Kansas-Texas Lines	Oct. 3,188	3,750,563	371,225	4,587,769	130,431	1,196,469	164,419	2,542,767	1,711,447
.....	10 mos. 3,188	3,750,563	371,225	4,587,769	130,431	1,196,469	164,419	2,542,767	1,711,447
.....	10 mos. 3,188	3,750,563	371,225	4,587,769	130,431	1,196,469	164,419	2,542,767	1,711,447
Missouri Pacific	Oct. 7,451	85,633,190	8,853,353	103,111,334	2,979,931	35,964,232	3,815,259	76,423,085	21,173,815
.....	10 mos. 7,451	85,633,190	8,853,353	103,111,334	2,979,931	35,964,232	3,815,259	76,423,085	21,173,815
Gulf Coast Lines	Oct. 1,026	967,599	85,608	1,119,025	42,412	279,679	64,427	762,063	330,281
.....	10 mos. 1,026	967,599	85,608	1,119,025	42,412	279,679	64,427	762,063	330,281
International-Great Northern	Oct. 1,159	1,128,424	1,099,253	12,920,362	2,088,447	2,304,957	422,421	5,261,483	1,617,715
.....	10 mos. 1,159	1,128,424	1,099,253	12,920,362	2,088,447	2,304,957	422,421	5,261,483	1,617,715
San Antonio, Uvalde & Gulf	Oct. 318	110,283	9,993	129,047	38,538	19,224	7,563	113,778	88,2
.....	10 mos. 318	1,296,946	149,957	1,564,214	59,470	416,857	75,942	1,123,040	71.8
.....	10 mos. 318	1,296,946	149,957	1,564,214	59,470	416,857	75,942	1,123,040	71.8
Mobile & Ohio	Oct. 1,152	1,094,425	51,529	1,212,274	50,378	443,280	48,049	922,091	76.1
.....	10 mos. 1,158	10,777,130	638,542	12,099,378	560,546	4,604,566	497,713	9,754,834	80.6
Monongahela	Oct. 177	511,413	3,607	518,073	65,000	45,000	1,290	130,997	48.6
.....	10 mos. 177	5,092,931	53,562	5,186,387	745,000	630,000	13,202	1,356,550	54.8
.....	10 mos. 6	.....	.....	128,484	26,613	300	62,869	21,905	14,438
Monongahela Connecting	Oct. 6	.....	.....	1,647,795	191,698	334,515	3,027	734,021	78.4
.....	10 mos. 6	.....	.....	1,647,795	191,698	334,515	3,027	734,021	78.4
Montour	Oct. 57	282,182	.....	283,745	36,154	42,022	1,674	66,883	56.2
.....	10 mos. 57	2,175,393	363	2,182,738	282,072	502,493	14,471	538,631	65.1
.....	10 mos. 1,203	1,348,400	133,511	1,635,837	246,018	346,789	64,829	597,449	81.5
Nashville, Chattanooga & St. Louis	Oct. 1,203	13,384,333	1,822,770	16,673,331	2,519,083	3,506,431	789,066	6,296,539	83.7
.....	10 mos. 1,203	13,384,333	1,822,770	16,673,331	2,519,083	3,506,431	789,066	6,296,539	83.7
Nevada Northern	Oct. 165	46,024	2,503	54,388	11,444	8,937	952	13,907	40,623
.....	10 mos. 165	546,384	29,416	646,196	58,279	30,354	52,810	142,987	382,938
.....	10 mos. 6	.....	.....	108,331	20,153	300	62,869	21,905	14,438
Newburgh & South Shore	Oct. 6	.....	.....	1,168,742	135,685	147,426	.....	538,874	274,651
.....	10 mos. 6	.....	.....	1,168,742	135,685	147,426	.....	538,874	274,651
New Orleans Great Northern	Oct. 264	218,538	11,374	237,281	36,982	32,809	16,156	71,676	70.7
.....	10 mos. 268	2,197,805	136,698	2,410,763	292,337	399,255	132,004	764,720	70.6
.....	10 mos. 20	1,521	.....	142,470	66,881	26,114	.....	1,536	105,079
New Orleans Terminal	Oct. 20	20,355	.....	1,370,108	173,860	151,458	.....	16,839	888,773
.....	10 mos. 20	20,355	.....	1,370,108	173,860	151,458	.....	16,839	888,773
New York Central	Oct. 11,477	26,271,822	8,226,062	40,247,401	5,893,429	7,570,843	788,327	14,506,059	76.2
.....	10 mos. 11,477	262,845,676	94,752,006	408,680,793	54,889,111	87,713,639	8,087,629	147,105,684	77.8
.....	10 mos. 120	.....	.....	1,020,783	115,000	76,641	4,759	389,938	62.2
.....	10 mos. 120	.....	.....	1,020,783	115,000	76,641	4,759	389,938	62.2
Indiana Harbor Belt	Oct. 120	.....	.....	9,221,864	906,000	986,000	49,549	3,795,615	67.2
.....	10 mos. 120	.....	.....	9,221,864	906,000	986,000	49,549	3,795,615	67.2
Pittsburgh & Lake Erie	Oct. 231	2,042,502	135,384	2,243,160	280,921	513,603	78,117	1,682,360	75.0
.....	10 mos. 231	21,615,860	1,510,516	23,878,940	2,606,351	6,705,879	791,733	18,666,623	78.2
.....	10 mos. 1,690	3,708,048	130,876	4,002,980	549,296	1,267,381	1,418,077	3,130,636	73.3
New York, Chicago & St. Louis	Oct. 1,690	36,685,486	1,693,130	39,932,048	5,387,241	7,549,126	1,263,381	12,979,681	74.9
.....	10 mos. 1,690	36,685,486	1,693,130	39,932,048	5,387,241	7,549,126	1,263,381	12,979,681	74.9
N. Y., New Haven & Hartford	Oct. 2,120	5,830,181	3,392,292	10,363,356	1,414,086	3,222,033	303,105	6,663,208	64.3
.....	10 mos. 2,129	53,000,779	35,582,101	100,494,315	14,472,517	35,335,344	3,149,996	67,913,160	67.6
.....	10 mos. 20	209,480	235,896	13,959	13,959	13,959	1,318	63,922	27.1
New York Connecting	Oct. 20	1,856,413	.....	2,118,065	196,590	112,388	.....	340,692	31.5
.....	10 mos. 20	1,856,413	.....	2,118,065	196,590	112,388	.....	340,692	31.5
New York, Ontario & Western	Oct. 568	614,286	28,922	775,733	108,188	155,591	28,059	649,600	83.7
.....	10 mos. 568	6,282,021	1,336,490	9,096,681	1,239,827	1,745,074	307,678	7,329,207	80.5

Revenues and Expenses of Railways

MONTH OF OCTOBER AND TEN MONTHS OF CALENDAR YEAR 1930—CONTINUED

Name of road	Av. mileage operated during period	Operating revenues			Operating expenses			Operating ratio	Net income from operation	Operating income (or loss)	Net operating income, 1929
		Freight	Passenger (inc. misc.)	Total	Maintenance of way and structures	Traffic	Transportation				
Norfolk & Western	2,240	\$8,113,981	\$261,526	\$8,375,507	\$946,710	\$1,712,831	\$2,659,541	58.9	\$3,551,200	\$2,801,064	\$3,082,853
Norfolk Southern	10 mos.	79,520,957	3,316,602	82,837,559	10,426,369	16,165,346	26,591,715	59.4	34,801,554	26,446,649	28,609,845
Norfolk Southern	10 mos.	932	615,373	17,071	87,086	79,475	25,985	67.9	213,072	185,712	136,663
Norfolk Southern	10 mos.	5,344,641	235,946	5,580,587	852,004	872,775	290,505	77.8	1,306,036	453,356	641,911
Norfolk Southern	10 mos.	7,045,103	479,547	7,524,650	717,607	1,383,065	2,535,418	63.7	2,964,344	2,303,723	2,607,688
Norfolk Southern	10 mos.	55,397,219	6,637,856	62,035,075	8,962,084	14,506,229	23,884,466	78.2	14,997,514	8,293,490	11,500,909
Northwestern Pacific	10 mos.	441	401,498	109,115	92,112	55,867	228,567	89.8	56,857	21,000	7,447
Northwestern Pacific	10 mos.	3,149,734	1,344,043	4,493,777	1,025,640	876,660	2,129,413	86.8	650,372	290,251	204,010
Oklahoma City-Ada-Atoka	129	69,801	2,346	72,147	21,535	7,712	13,077	70.7	22,049	17,284	4,104
Oklahoma City-Ada-Atoka	10 mos.	673,729	45,767	719,496	242,022	77,097	243,966	80.8	144,593	101,131	—3,496
Pennsylvania Railroad	10 mos.	36,974,646	8,832,348	45,806,994	5,801,920	9,089,169	17,920,327	69.9	15,327,574	11,190,565	9,742,574
Pennsylvania Railroad	10 mos.	344,757,373	98,987,513	443,744,886	60,405,693	94,501,145	168,712,233	74.2	121,056,613	94,478,314	81,972,660
Long Island	404	1,136,673	2,030,788	3,167,461	339,587	472,388	1,279,975	64.7	1,190,642	920,473	729,067
Peoria & Pekin Union	10 mos.	8,221,605	337,366	8,558,971	3,966,352	4,381,010	12,845,128	63.5	11,644,590	8,819,331	7,188,800
Peoria & Pekin Union	10 mos.	16,167	607	16,774	16,376	9,578	60,800	68.0	47,263	27,166	50,311
Peoria & Pekin Union	10 mos.	150,680	9,574	160,254	226,270	139,439	610,248	79.8	281,165	114,148	352,722
Pere Marquette	2,264	2,874,811	125,181	3,000,000	393,407	617,243	1,133,496	73.1	852,808	693,801	563,325
Pittsburgh & Shawmut	10 mos.	28,557,385	1,898,624	30,456,009	4,592,294	6,578,335	11,149,619	76.6	7,565,043	5,934,858	4,463,713
Pittsburgh & Shawmut	10 mos.	132,771	425	133,196	26,577	7,432	45,860	79.2	28,354	25,550	20,396
Pittsburgh & Shawmut	10 mos.	1,290,027	8,452	1,298,479	298,914	264,558	68,372	82.3	236,257	207,886	135,299
Pittsburgh & Shawmut	10 mos.	937,453	37,015	974,468	133,153	222,885	656,644	73.7	261,088	250,151	271,862
Pittsburgh & Shawmut	10 mos.	318,600	2,501	321,101	55,103	75,283	27,267	79.4	16,697	12,004	8,596
Pittsburgh & Shawmut	10 mos.	3,008,028	29,422	3,037,450	278,215	74,127	255,860	96.7	21,035	—25,887	—52,757
Pittsburgh & Shawmut	10 mos.	132,771	425	133,196	26,577	7,432	45,860	79.2	28,354	25,550	20,396
Pittsburgh & Shawmut	10 mos.	1,290,027	8,452	1,298,479	298,914	264,558	68,372	82.3	236,257	207,886	135,299
Quincy, Omaha & Kansas City	249	528,774	4,117	532,891	81,241	8,966	27,267	79.4	16,697	12,004	8,596
Quincy, Omaha & Kansas City	10 mos.	5,814,314	442,587	6,256,901	1,336,537	2,677,571	2,856,312	79.1	1,624,161	1,525,424	1,539,641
Quincy, Omaha & Kansas City	10 mos.	63,411,151	5,023,084	68,434,235	11,342,523	17,874,617	28,209,310	83.1	12,403,809	9,588,662	9,888,945
Atlantic City	163	118,507	60,690	179,197	80,175	14,300	4,674	132.7	—63,471	—104,661	—119,679
Richmond, Fredericksburg & Potomac	10 mos.	1,101,678	1,413,850	2,515,528	705,281	223,949	1,724,129	101.0	—28,326	—40,528	—63,031
Richmond, Fredericksburg & Potomac	10 mos.	349,376	181,798	531,174	80,900	167,375	268,667	86.6	90,570	55,968	23,360
Richmond, Fredericksburg & Potomac	10 mos.	4,386,728	2,711,623	7,098,351	1,227,187	1,699,866	3,117,972	77.4	1,971,294	1,534,753	1,038,599
Rutland	413	280,602	64,363	344,965	88,776	83,779	186,167	84.0	74,280	48,567	56,064
Rutland	10 mos.	2,699,848	764,930	3,464,778	828,882	886,094	1,715,271	84.2	715,759	481,499	543,526
St. Louis-San Francisco	5,261	5,309,241	586,186	5,895,427	642,878	912,134	2,037,749	63.07	2,374,742	1,930,719	2,409,493
St. Louis-San Francisco	10 mos.	48,960,103	7,046,537	55,996,640	7,750,199	11,019,082	20,891,102	70.60	17,952,439	14,339,587	14,444,501
Ft. Worth & Rio Grande	233	55,361	4,174	59,535	26,686	14,550	37,877	128.3	—19,080	—23,487	—32,382
Ft. Worth & Rio Grande	10 mos.	575,543	42,095	617,638	698,248	151,803	386,841	117.7	123,656	—168,366	—255,479
St. Louis-San Francisco	10 mos.	162,940	7,563	170,503	33,445	22,889	59,230	72.8	48,485	44,713	11,593
St. Louis-San Francisco	10 mos.	1,406,612	93,349	1,500,000	1,573,299	291,529	586,663	84.6	242,205	201,492	—92,515
St. Louis-Southwestern Lines	1,882	1,642,774	61,221	1,704,000	249,124	238,012	611,213	70.5	540,348	412,793	313,776
St. Louis-Southwestern Lines	10 mos.	16,818,756	755,462	17,574,218	2,898,991	2,949,866	6,515,916	76.5	4,444,403	3,527,191	2,091,144
San Diego & Arizona	155	53,674	9,127	62,801	15,333	16,237	20,498	99.3	459	5,155	3,152
Seaboard Air Line	4,493	3,311,066	305,232	3,616,298	538,524	818,589	1,491,876	80.3	784,716	559,477	531,724
Seaboard Air Line	10 mos.	32,802,099	4,819,476	37,621,575	5,687,727	7,665,945	15,487,527	79.0	8,730,152	5,677,318	5,038,534
Southern Ry.	6,731	8,149,929	1,221,282	9,371,211	1,337,919	1,761,615	3,538,757	71.2	2,941,212	2,332,531	2,250,252
Southern Ry.	10 mos.	78,011,685	14,666,144	92,677,829	14,989,846	19,092,429	32,437,337	75.4	24,874,931	17,643,833	16,280,545
Alabama Great Southern	314	528,792	86,209	615,001	111,568	130,395	217,980	75.5	164,259	107,742	110,129
Alabama Great Southern	10 mos.	5,319,905	998,419	6,318,324	1,254,222	1,572,722	2,195,328	80.7	1,317,253	806,281	977,578
Cinn., New Orleans & Texas Pacific	338	1,221,044	124,744	1,345,788	222,574	338,793	418,824	74.1	3,859,910	271,508	286,989
Cinn., New Orleans & Texas Pacific	10 mos.	12,840,929	1,763,181	14,604,110	2,575,609	3,435,401	4,540,229	75.0	3,859,272	2,960,266	2,966,369
Georgia Southern & Florida	397	200,492	39,117	240,609	61,847	1,683	103,104	88.2	230,691	6,128	13,680
Georgia Southern & Florida	10 mos.	2,168,133	680,090	2,848,223	630,671	669,945	1,124,763	81.9	558,830	315,244	302,001
New Orleans & Northeastern	204	272,882	40,907	313,789	55,247	10,040	123,116	75.7	273,176	27,054	13,829
New Orleans & Northeastern	10 mos.	2,912,733	478,375	3,391,108	575,613	715,508	1,176,539	80.0	884,263	455,625	193,395
Northern Alabama	110	84,012	3,144	87,156	9,482	3,053	29,377	51.6	43,553	38,020	20,739
Northern Alabama	10 mos.	784,414	33,596	818,010	193,169	20,384	285,928	66.7	281,968	226,637	42,070

Revenues and Expenses of Railways

MONTH OF OCTOBER AND TEN MONTHS OF CALENDAR YEAR 1930—CONTINUED

Name of road	Av. mileage operated during period	Operating revenues			Operating expenses			Operating ratio	Net from railway operation	Operating income (or loss)	Net ry. operating income	Net ry. operating income, 1929
		Freight	Passenger (inc. misc.)	Total	Traffic	Trans- portation	General					
Southern Pacific	9,128	\$14,581,229	\$2,369,466	\$18,366,025	\$359,031	\$5,609,341	\$625,467	58.6	\$7,600,997	\$6,019,513	\$5,242,331	\$5,942,021
So. Pacific Steamship Lines	9,124	119,018,392	29,337,403	162,371,725	4,104,247	53,248,987	6,539,158	69.8	49,116,206	35,810,671	31,124,500	43,027,666
	10 mos.	647,572	44,781	742,211	117,780	498,375	31,215	92.9	52,987	51,619	51,722	2,276
	10 mos.	5,810,777	540,373	6,781,444	211,937	4,744,036	391,507	104.4	—300,204	—313,816	—293,446	—97,712
Texas & New Orleans	4,721	4,562,857	588,162	5,633,702	151,112	1,674,582	241,160	62.7	2,101,311	1,697,103	1,438,065	1,832,803
Spokane, Portland & Seattle	4,721	41,637,488	7,085,064	52,835,401	1,761,014	17,332,165	2,377,854	75.3	13,031,163	9,695,599	6,940,923	10,142,596
	10 mos.	554	55,752	707,427	1,09,562	226,023	25,117	66.5	236,708	150,078	132,675	132,675
	10 mos.	5,444,261	732,778	6,779,629	129,057	2,159,747	233,388	68.2	2,155,310	1,286,371	1,128,058	2,031,850
Tennessee Central	295	256,886	9,103	279,023	8,448	88,773	13,393	69.4	85,504	75,541	57,775	68,487
Term. R. R. Assn. of St. Louis	295	2,382,140	105,306	2,623,774	93,077	921,034	139,501	77.8	582,045	511,623	338,718	458,382
	10 mos.	55	.....	856,142	3,432	394,062	23,975	76.1	204,659	90,992	179,104	277,410
	10 mos.	.....	.....	8,757,237	31,126	4,056,047	260,282	74.6	2,226,799	1,122,872	2,014,895	3,130,622
Texas & Pacific	1,955	2,434,213	324,995	3,002,494	87,710	944,740	127,573	68.7	940,393	815,998	686,749	1,150,509
Texas Mexican	1,955	25,780,697	3,795,020	31,883,435	886,083	10,128,778	1,268,154	69.8	9,621,002	7,930,017	6,027,401	7,580,773
	10 mos.	162	2,930	87,557	3,046	31,208	7,851	85.9	12,319	7,317	593	—8,994
	10 mos.	828,405	32,924	960,578	33,790	392,160	80,925	84.3	150,594	100,258	27,668	106,880
Toledo, Peoria & Western	239	178,229	168	181,881	13,396	56,443	9,735	62.1	69,014	58,514	45,676	47,723
Toledo Terminal	239	1,652,266	2,478	1,694,182	142,591	62,644	93,407	75.5	415,750	335,604	248,209	425,396
	10 mos.	28	.....	93,812	5,770	456,809	50,281	78.3	20,363	9,409	28,309	71,677
	10 mos.	.....	.....	977,818	5,770	456,809	50,281	82.7	168,952	36,454	240,543	526,627
Ulster & Delaware	128	35,434	1,838	72,855	1,253	38,546	4,153	104.6	—3,318	—8,318	—9,910	—4,676
Union R. R. of Penna.	128	332,826	152,890	851,749	14,329	424,141	39,493	86.6	96,888	39,188	12,219	47,235
	10 mos.	45	.....	769,306	181	314,563	15,268	86.4	104,749	84,849	147,310	344,994
	10 mos.	45	.....	7,951,654	1,641	3,276,562	149,290	76.4	1,878,466	1,606,366	2,236,624	3,437,365
Union Pacific	3,765	11,425,475	889,840	13,101,709	156,565	3,137,396	336,509	49.0	6,680,551	6,106,099	5,210,356	5,704,030
	10 mos.	3,765	72,779,346	91,430,516	1,846,582	25,894,355	3,338,045	65.6	31,439,740	24,957,256	21,675,666	25,530,965
	10 mos.	2,539	3,505,767	4,343,391	50,354	1,001,637	129,407	51.0	1,924,030	1,673,077	1,446,206	1,754,835
Oregon Short Line	2,538	23,653,391	2,530,256	28,437,105	557,214	8,413,061	1,263,292	68.6	8,919,178	5,927,199	4,840,363	7,222,834
Oregon-Wash. R. R. & Nav. Co.	2,336	2,071,728	159,821	2,451,498	71,711	825,460	123,724	68.8	763,879	572,363	425,328	530,704
Los Angeles & Salt Lake	2,336	17,044,920	1,925,717	20,972,332	774,471	7,810,126	1,236,753	80.4	4,100,289	2,867,229	1,097,385	1,872,552
	10 mos.	1,229	1,603,539	2,217,717	63,562	608,811	86,161	69.5	603,699	519,617	379,550	603,352
	10 mos.	1,229	3,234,747	19,404,251	804,876	6,130,263	850,679	75.0	4,842,072	3,340,575	2,044,499	3,923,178
St. Joseph & Grand Island	258	399,817	6,253	414,461	3,388	117,612	17,688	51.9	199,210	169,873	126,997	160,352
Utah	258	2,884,709	74,590	3,070,791	34,025	1,015,059	167,722	66.3	1,034,491	834,488	583,954	637,727
	10 mos.	111	2,117,000	2,117,000	405	45,504	5,779	56.8	91,419	75,586	63,201	76,716
	10 mos.	1,266,205	.....	1,271,807	3,700	313,373	60,071	72.6	349,013	268,757	137,942	444,081
Virginian	561	1,518,528	14,384	1,616,849	14,848	314,962	32,936	45.4	882,599	687,599	776,735	861,977
Wabash	553	13,631,498	212,036	14,078,652	146,700	3,025,843	328,332	52.1	7,031,013	5,383,991	6,105,268	7,180,510
	10 mos.	2,523	385,002	5,310,429	184,920	1,982,100	17,448	73.6	1,403,243	1,208,067	1,403,243	1,580,236
	10 mos.	2,523	4,457,931	52,883,414	1,901,974	20,720,540	2,252,477	77.2	12,049,320	9,875,066	6,820,513	11,819,153
Ann Arbor	293	436,663	10,462	466,276	13,687	186,830	16,475	75.2	115,576	89,801	59,135	114,805
Western Maryland	293	3,980,459	116,856	4,266,617	144,261	1,752,194	152,667	76.8	989,552	725,989	458,568	886,197
	10 mos.	896	9,946	15,034,273	39,438	374,366	41,079	63.7	5,263,527	4,373,527	3,784,451	705,203
	10 mos.	895	13,947,845	149,750	437,668	3,918,895	429,202	65.0	5,263,527	4,373,527	4,475,595	4,804,170
Western Pacific	1,051	2,000,113	72,500	2,332,982	66,685	664,877	49,590	47.9	1,215,655	1,120,244	930,397	617,884
Wheeling & Lake Erie	1,051	11,759,280	985,618	14,008,811	696,844	4,971,614	489,987	80.4	2,793,419	1,770,642	1,648,037	2,446,057
	10 mos.	511	1,171,984	12,405	335,887	400,859	42,482	76.9	4,144,237	2,832,949	2,066,369	503,317
	10 mos.	511	13,276,487	157,057	372,358	4,230,962	440,278	71.2	4,144,237	2,832,949	2,946,621	4,762,749
Wichita Falls & Southern	203	68,147	315	75,271	2,558	21,724	3,417	64.92	26,559	21,375	16,814	34,233
	10 mos.	203	734,852	3,971	28,572	246,909	43,820	71.23	225,104	172,597	116,244	208,663

News of the Week

(Continued from page 1289)

creased production of feed grains in the southeast being offset by the movement from primary markets. Sugar, syrup and molasses demand is anticipated to equal that of 1930, while the production of fresh fruits will be greater, potatoes 10 per cent smaller and other fresh vegetables 11 per cent greater than in 1930.

Postoffice Asks Higher Parcel Post Rates

The Postmaster General, Walter F. Brown, has filed with the Interstate Commerce Commission a request for its consent, as required by law, for the establishment of a revised and higher scale of parcel post rates, saying that it has been found that the existing rates are inequitable and do not produce sufficient revenue to pay the cost of handling and transportation and that the weight and size limits are such as to prevent the shipment of desirable articles. He proposed to increase the maximum weight for a parcel post package from 50 to 70 pounds and the maximum combined length and girth from 84 to 100 inches, as well as to establish, on July 1, 1931, a revised scale of rates for fourth-class matter. J. C. Harraman, for many years an examiner for the Interstate Commerce Commission, was recently appointed director of parcel post for the department, and announcement was then made that it was proposed to seek a revision of rates designed to develop the business.

New York Puts 92 Elimination Projects on 1931 Program

The Public Service Commission of New York has announced its approval of a list of railroad grade crossings to be considered for elimination during 1931. This list includes 92 projects, involving a total estimated cost of \$33,887,700. Some of the projects involve the proposed elimination of more than one crossing. Hearings will be held on each of the projects in the approved list, after which the commission will determine whether or not the crossings are to be eliminated and the method to be used.

The approval of this list of crossings to be considered for elimination during the coming year makes it apparent that this program is probably the last which the commission can approve under the \$300,000,000 grade crossing elimination bond approved by the people of the state of New York in 1926. The approval of the list leaves only \$45,688,394 of the bond issue money, out of which the cost of land appropriated in damages assessed by reason of claims filed subsequent to the completion of the work will have to be paid. This amount will also have to cover any application for funds which the Transit Commission may make next year for the elimination of crossings in New York City.

In addition to approving the list of new projects to be considered for elimination during 1931, the Commission approved the carrying over of 82 projects

from the 1930 program which had been under consideration during the present year but upon which no determination was reached. This is done in order to hold jurisdiction over these cases. Further hearings will be held on these projects during 1931.

The total estimated cost of eliminating the crossings which are carried over from the 1930 program is \$36,547,700. This amount, added to the estimated cost of eliminating the crossings on the 1931 program, brings the total estimated cost of eliminating the crossings on both programs to \$70,435,400. This exceeds by nearly \$8,000,000 the total estimated cost of eliminating the crossings on the 1930 program, together with those carried over from the 1929 program.

The crossings to be considered for elimination in 1931 are divided by railroads as follows: New York Central, 36; Long Island, 12; Delaware & Hudson, 11; Erie, 8; Delaware, Lackawanna & Western, 7; Pennsylvania, 6; Lehigh Valley, 5; Boston & Maine, 2; New York, New Haven & Hartford, 2; Buffalo, Rochester & Pittsburgh, 1; New York Central-Erie, 1; and Pennsylvania-Buffalo, Rochester & Pittsburgh, 1. The same roads are concerned in the 82 elimination projects on which hearings were held in 1930, but upon which no decision was reached, and to which further consideration will be given during 1931.

Half the cost of eliminating the crossings is paid by the railroad affected; 49

per cent by the state and one per cent by the counties in which the crossings are located. Under this plan the railroad corporations' share of the cost of eliminating the crossings on the 1931 list is \$16,943,850.

Western Grain Rate Order Postponed

The Interstate Commerce Commission, at a special conference on December 5, postponed from January 1 to April 1 the effective date of its order requiring a general downward revision of freight rates on grain and grain products in the western district, which the roads have estimated would reduce their revenues by \$20,000,000 a year. The roads had petitioned for this postponement of the date on the ground that it would be physically impossible to prepare the necessary tariffs in the time allowed. The western executives had also suggested that the commission postpone its order for at least a year during the present emergency. In announcing the postponement, however, the commission said it was with "the confident expectation that ways will be found to comply with the order" by the new date set.

Ask Canadian Railways to Provide Partitions in Stock Cars

An application for an order requiring the railway companies to install permanent, movable partitions in livestock cars was made to the Board of Railway Commissioners in Ottawa last week when representatives of the Eastern and Western Canada Livestock Unions appeared to urge for this improvement. E. Miall of Ottawa, for the breeders and stockmen, explained to the board that at present when shipments of cattle were made by farmers or other cattle raisers temporary partitions had to be placed in the railway cars to separate the animals in groups. These partitions were provided at the shippers' expense, as provided for in the freight classification regulations. What was now wanted was that the carriers equip their cars with permanent movable partitions in order to meet the requirements of shippers and stockyard men.

Special Board of Engineers Favors Improvement of Upper Mississippi

A special board of Army engineers appointed to make a survey and report on the proposed development of a nine-foot channel in the upper Mississippi river between the mouth of the Missouri river and Minneapolis, has submitted its final report recommending the expenditure of \$124,000,000 for the project, including the construction of 24 new locks and dams, together with dredging and other necessary works, and \$1,750,000 annually for operation and care of locks and dams and for channel maintenance. The report, which follows an interim report issued last February, is now before the Board of Engineers for Rivers and Harbors for review; but Congress has already, in the last rivers and harbors bill, authorized the expenditure of \$7,500,000 for part of the work without awaiting the final report. An unfavorable report had been

Fairer Competition

"Right along the railroads have been the Martha, never the Mary, of all situations that spelled sacrifice. Whenever there was an emergency call, as for drought relief, it was the railroads that were asked to help out, at serious cost to their revenues. Right along, also, there has been a paring of rate revenues, with the Commerce Commission seemingly always inclined to listen more kindly to shipper than to carrier.

"But there is a yet more fundamental trouble,—which seems also to be worrying railroad security holders. It is the absolute loss of business to rival modes of transportation—of persons and of goods—in a competition which the railroads feel is doubly unfair. That is, these rivals are getting virtual subsidies (partly paid by the railroads themselves) and at the same time are free from various burdens and limitations, including "regulation," which are imposed upon the railroads. * * *

"The railroads have been long-suffering and patient. It is time that they found voice in the matter. And it is high time for Congress and all other public bodies concerned to 'stop, look and listen!'"

—Boston News Bureau

made by the district engineer but local interests favoring the project obtained a review by the board which ordered a survey.

Suisun Bay Bridge Shortens Schedules

The Southern Pacific plans to reduce the running time of several of its passenger trains between Portland, Ore., and San Francisco, Cal., as much as 1 hr. 45 min. on December 28, the improvement being made possible by the completion of the new Suisun Bay bridge which removes the necessity of using train ferries across Carquinez Straits between Benicia, Cal., and Port Costa. The schedule of the Cascade Limited will be cut 45 min., the train making the run, both north and southbound, 771 miles, in 21 hr.

The schedule of the West Coast will be cut 1 hr. 45 min., taking 36 hr. 5 min. between Los Angeles, Cal., and Portland, Ore.

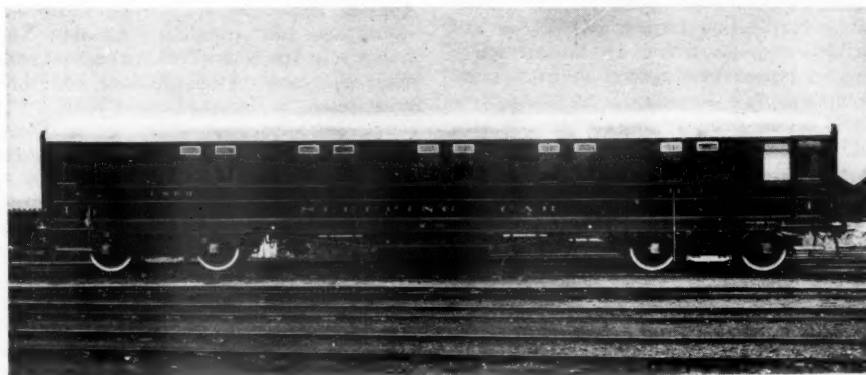
The schedule of the Oregonian will be reduced 30 min., thus placing the train on a schedule of 32 hr. 40 min. between San Francisco and Portland.

Expect Three Thousand To Attend N. Y. Railroad Club Dinner

Approximately 3,000 members and guests of the New York Railroad Club are expected to attend that organization's fifty-eighth annual dinner at the Commodore Hotel, New York City, December 17, according to a recent announcement of the committee in charge of arrangements.

The speaker, as announced in the *Railway Age* of November 22, page 1108, will be Judge Harold B. Wells of the Court of Errors and Appeals, State of New Jersey. George Le Boutillier, vice-president of the Pennsylvania and president of the club, will preside, while W. G. Besler, chairman of the board, Central of New Jersey, will act as toastmaster. Special musical and entertainment features will also be included.

Following is a list of committee chairmen in charge of arrangements for the dinner: Edward Laterman, general chairman; H. H. Vreeland, reception committee; George H. Ord, dinner committee; H. M. Norris, seating committee; H. B. Doyle, entertainment committee.



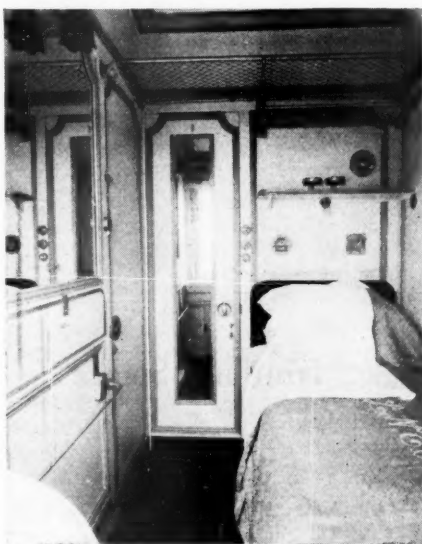
One of the L. N. E.'s New Sleeping Cars

Foreign

New Sleeping Cars for L. N. E. of Great Britain

The London & North Eastern of Great Britain has recently placed in service several new sleeping cars, embodying many new features of interior design and decoration. Two of these new cars, recently constructed at the Doncaster Works of the L. N. E., include complete departures from previous practices in decoration and furnishing.

Among the more important new features introduced is the painting of the interiors. Until recently, polished wood



View of Compartment Looking Toward Door

was used almost exclusively in the interior decoration of British sleeping car berths. The colors have been so chosen that each compartment, which is fitted with a regular bed, has the appearance of a small well-appointed bedroom. The floor is covered with Persian design close covered carpet having a ground of dark blue; the corridor is covered with similar carpet having a line border all around. Hot and cold water is supplied to each compartment which has a wash bowl fitted in the corner near the window. A large mirror is placed centrally on the

intermediate partition and a full length mirror is fixed on the door leading to the corridor. A folding table is provided on the intermediate partition and another one to take a tea tray is placed over the bed. A shelf is fitted over the bed head.

The lighting is provided by a 30 watt opal lamp carried in a special fitting in the centre of the ceiling; a reading lamp is included under the shelf over the bed head. There is also a lamp enclosed in a silk shade on the partition over the mirror. A steam heated radiator is provided on the partition below the mirror, the regulator controlling it being placed near the bed head. In addition to the ventilation provided by means of window and extractor ventilators, the car is fitted with pressure ventilation. The air supplied to each berth is drawn through a filter by a noiseless electric blower fan at one end of the corridor. A toilet compartment is provided at one end of the corridor. The attendant's compartment is at the opposite end of the car, and is fitted with the necessary cupboards for crockery, sink, etc., to enable light refreshments to be served. The apparatus for supplying hot water to the berths is also included in the attendant's compartment and forms one of the principal features of the car. The water is heated by electricity, and thereby it has been possible to dispense entirely with gas.

The cars are built of teak, and special attention has been paid to the elimination of noise. The body itself is carried on india rubber pads insulating it from the steel frame, and compressed "Wadnit" asbestos felt has been placed between the upper and lower courses of the double



Interior of Compartment as Seen from Corridor

floors. The same felt is also used to fill in all space between the inner and outer roof and body sides. The floors are covered with sponge rubber half an inch thick under the carpets, and the result has been to produce unusual quiet in running.

The overall length of each car is 63 ft. 6 in. the body being carried on a steel underframe mounted on two standard L.N.E.R. four-wheel compound-bolster 8 ft. 6 in. wheelbase trucks. Pullman vestibules are also included.

Supply Trade

J. R. Shea and B. M. Brownell, formerly associated with H. B. Wilson & Co., at St. Louis, Mo., have organized the **Shea-Brownell Company**, with offices in the Syndicate Trust building, St. Louis, and will engage in the sale of railway and industrial equipment.

Obituary

Walter Ross Gravenor, southeastern sales manager of the American Steel Foundries, Washington, D. C., died on November 21. Mr. Gravenor was born on January 25, 1872 at Ludlow, Ky., and was educated in Palatka, Fla., public schools. He began work as clerk in the office of the superintendent of motive power on the Plant System Railroad, (now a part of the Atlantic Coast Line)



Walter Ross Gravenor

about 1890. He left the Plant System in 1900 and became associated with the American Steel Castings Company at New York. In the formation of the American Steel Foundries about 1903, this company was included and Mr. Gravenor became associated with the American Steel Foundries as salesman in the New York office; he moved to Washington in 1905 and opened the office as sales agent handling the southeastern territory. Mr. Gravenor was appointed southeastern sales manager in November, 1929, and held the same position until his death.

Trade Publication

CORK INSULATION.—The United Cork Companies, Lyndhurst, N. J., has issued a 1931 edition of its insulation handbook, which represents the co-ordination of the long experience acquired in the use of cork as an insulating material in the refrigerating industry. The book, which is in catalogue form, with 16 pages, contains detailed information concerning the uses of cork and construction methods in its application, together with numerous specifications and details for specific applications of cork for insulating purposes.

Equipment and Supplies

Freight Cars

THE GREAT NORTHERN plans to build or rebuild 2,000 freight cars in its own shops during 1931.

THE CARNEGIE STEEL COMPANY has ordered 30 gondola cars from the American Car & Foundry Company; 20 flat cars from the Pressed Steel Car Company, and 18 special flat cars from the Standard Steel Car Corporation; all these cars are to be of 70 tons' capacity. Inquiry for this equipment was reported in the *Railway Age* of August 30.

THE ATCHISON, TOPEKA & SANTA FE has ordered 500 refrigerator cars from the Pullman Car & Manufacturing Corporation; 350 box cars from the Pressed Steel Car Company; 300 box cars from the General American Car Corporation and 300 box cars from the American Car & Foundry Company. Inquiry for this equipment was reported in the *Railway Age* of November 8.

Iron and Steel

THE LOUISVILLE & NASHVILLE has ordered 20,000 tons of rail from the Illinois Steel Company.

THE NEW YORK CENTRAL has taken bids on 420 tons of steel for grade crossing elimination work at Bowmansville, N. Y.

THE CHICAGO GREAT WESTERN has ordered 5,000 tons of rails, the distribution being 3,000 from the Illinois Steel Company and 2,000 from the Inland Steel Company.

THE PENNSYLVANIA has ordered 4,200 tons of steel for the Market street viaduct and plaza at Philadelphia, Pa., from the American Bridge Company. Bids have also been taken for 200 tons of steel for bridges at Dewart and McKeesport, Pa.

DROP TESTING PLANT.—The drop testing plant which forms a part of the Waugh-Gould draft gear testing laboratories located at Depew, N. Y., is described and illustrated in an attractive booklet issued by the Waugh Equipment Company, 420 Lexington avenue, New York. The drop testing laboratory, installed by the company to enable its engineers to determine accurately under uniform conditions the comparative capacity, sturdiness, endurance, absorption, recoil and resiliency of draft gears, is equipped with every known instrument for measuring the performance of draft gears throughout their test as well as for making precision measurements of the effects of the tests on the gear. The drop hammer is equipped with a 9,000-lb. tup.

Construction

BOSTON & MAINE.—The Public Service Commission of New York has authorized this company to use company forces for the work of relocating its eastbound tracks and making necessary changes in signals, water columns and freight facilities in connection with the elimination of West street crossing, at Johnsonville station, Pittstown, N. Y. The amount involved is limited to \$58,104.

DELAWARE & HUDSON.—This company has been authorized by the Public Service Commission of New York to use company forces for work required by the elimination of its Campbell avenue, Fort Hunter road and Mill road grade crossings, all located from 2.6 to 3.9 miles west of Schenectady station in Schenectady, N. Y., and Rotterdam. The amount to be expended on removal of present facilities and permanent relocation of tracks and signal system is limited to \$224,676.

ERIE.—The New York Public Service Commission has designated for elimination the Cemetery road crossing of the Erie tracks in Lancaster, N. Y. The elimination is to be accomplished by carrying the highway over the railroad on its present alignment on a six-span bridge, 260 ft. in length and estimated to cost \$120,317.

FAIRPORT, PAINESVILLE & EASTERN.—The Interstate Commerce Commission has modified an authority for construction granted to this company to permit it to construct an extension from its eastern terminus near Painesville, Ohio, eastward to a point near Madison. Authority for the construction of a 14-mile line to connect with the Pennsylvania at Austinburg was denied, and previous authority to construct a two-mile spur line was revoked because of the requirement for the elimination of a grade crossing which would have quadrupled the cost of construction.

LONG ISLAND.—In order to provide necessary power for the operation of additional multiple unit cars recently placed in service, and to take care of future additions to passenger equipment, this company, as reported in the *Railway Age* of December 6, is remodeling one substation and erecting four new substations in its New York suburban zone, while the construction of four additional substations is planned for 1931. The remodeled substation is located at Floral Park, N. Y., where two new 3,000-kilowatt mercury-arc rectifier units will be in operation by January 1. New substations at Hempstead, N. Y., Manhasset and Rockaway Park, each equipped with one 3,000-kilowatt rectifier unit, are to go under construction in the near future and will be placed in service during January and February, 1931. The fourth new station will be located at Goose Creek, where a siding and shed are to

be built to house portable substation cars, together with necessary switching equipment. Locations for the four additional substations, each to contain one 3,000-kilowatt rectifier unit, have not been finally determined, although plans are now under consideration. Rectifiers, transformers and other related equipment for converting power from alternating current at high voltage to direct current at 650 volts, are being furnished by the American Brown Boveri Company. Switching equipment is being furnished by the Westinghouse Electric & Manufacturing Company, outdoor high tension disconnecting switches by the Railway & Industrial Engineering Company, and control storage batteries by the Philadelphia Battery Company. The remodeling of the substation at Floral Park, together with the installation of foundations and erection of steel work to support the outdoor high voltage equipment and wiring, is being done by Julius Auserehl.

NEW ORLEANS PUBLIC BELT.—The Interstate Commerce Commission has authorized this company to extend its line 4.9 miles, involving a bridge over the Mississippi river, estimated to cost slightly less than \$20,000,000, which bridge will be used by both highway and railway traffic.

NEW YORK CENTRAL.—This company has awarded contracts for the demolition of buildings between West Thirtieth and West Thirty-seventh streets, New York, to McKofsky-Abramsen Company, New York, and for the elimination of grade crossings at Utica, N. Y., and Harbor, to the Walsh Construction Company of Syracuse, N. Y. An additional contract for grade crossing elimination at Kitchawan, N. Y., has been let to the Bates & Rogers Construction Company, New York.

TERMINAL RAILROAD ASSOCIATION OF ST. LOUIS.—The Interstate Commerce Commission has authorized this company to operate over the Municipal bridge owned by the city of St. Louis, to which the municipality will lay double-track connections, and the construction by the Terminal Association of a union station in East St. Louis, Ill. Total route mileage, approximately six; estimated cost, \$3,250,000. The station is estimated to cost \$700,000.

STANDARD SPECIFICATIONS FOR RAILS AND FASTENINGS.—This is the title of a 90-page, attractively-printed booklet which has recently been issued by the Robert W. Hunt Company, Chicago. It contains the standard specifications for rails and track fastenings of the American Railway Engineering Association and the American Society for Testing Materials, together with a list of the mills in the United States and Canada at which standard rails are ordinarily rolled, a table giving the properties and dimensions of modern rail sections, and a chart showing typical rail branding and heat stamping.

Railway Finance

ALGERS, WINSLOW & WESTERN.—*Securities.*—The Interstate Commerce Commission has authorized this company to issue \$250,000 of first mortgage 6 per cent bonds, maturing in installments to 1940, and sell them to the Guardian Trust Company at 95, making the average annual cost to the railroad approximately 7.166 per cent, and to issue \$252,000 of general mortgage 6 per cent bonds and 5,000 shares of common stock without par value, to be delivered in exchange for the railroad properties which it is acquiring.

APALACHICOLA NORTHERN.—*Bonds.*—The Interstate Commerce Commission has authorized this company to extend for five years the maturity dates of \$2,000,000 of its first mortgage 5 per cent bonds.

BALTIMORE & OHIO.—*More Time Asked to Dispose of Western Maryland.*—This company has applied to the Interstate Commerce Commission for a further extension of time from January 13, 1931, to July 13 in which to divest itself of its stock in the Western Maryland in accordance with the Commission's order.

BURLINGTON-ROCK ISLAND.—*Trackage Rights.*—The Interstate Commerce Commission has authorized this line to operate under trackage rights between Houston and Galveston over the line of the Texas & New Orleans.

CHICAGO, BURLINGTON & QUINCY.—*Extra Dividend.*—The directors of this company on December 4 declared out of surplus an extra dividend of \$5 a share.

DEATH VALLEY.—*Abandonment.*—This company has applied to the Interstate Commerce Commission for authority to abandon its line from Death Valley Junction to Ryan, Cal., 20.3 miles.

FAIRPORT, PAINESVILLE & EASTERN.—*Stock.*—The Interstate Commerce Commission has authorized this company to issue \$100,000 of capital stock to be offered pro rata to its stockholders at par, such stock as is not subscribed for by stockholders to be sold subject to a commission not exceeding 10 per cent.

INDIANA HARBOR BELT.—*Extra Dividend.*—An extra dividend of \$10 a share has been declared on the capital stock of this company, along with the regular semi-annual dividend of \$5 a share.

KANKAKEE & SENECA.—*Bonds.*—This company has applied to the Interstate Commerce Commission for authority to issue \$704,000 of general mortgage gold bonds, to provide for the retirement of \$650,000 of first mortgage bonds that matured on July 1, 1922, and for other purposes.

LEHIGH VALLEY.—*Extra Dividend Omitted.*—The directors of this company

on December 3 declared the regular quarterly dividends of 87½ cents on the common and \$1.25 on the preferred stock of the company but omitted the usual \$1 extra dividend on the common stock.

PENNSYLVANIA.—*New Director.*—Pierre S. DuPont, chairman of the board of the DuPont de Nemours Company, has been elected a director.

PITTSBURGH & WEST VIRGINIA.—*Proposed Acquisition of W. & L. E.*—Oral arguments were heard by the Interstate Commerce Commission on December 10 on this company's application for authority to acquire control of the Wheeling & Lake Erie.

POINT ST. JOE DOCK & TERMINAL.—*Bonds.*—The Interstate Commerce Commission has authorized this company to extend for five years the maturity dates of \$250,000 of first mortgage 6 per cent bonds and \$1,000,000 of refunding 5 per cent bonds.

TEXAS & PACIFIC.—*Bonds.*—This company has applied to the Interstate Commerce Commission for authority to procure the authentication and delivery of \$19,730,000 of general and refunding mortgage 5 per cent bonds, to sell \$13,000,000 of the bonds and to pledge and repledge the remainder as collateral for short-term notes.

Average Prices of Stocks and of Bonds

	Dec. 9	Last week	Last year
Average price of 20 representative railway stocks..	85.28	91.72	133.33
Average price of 20 representative railway bonds..	91.13	92.37	93.10

Dividends Declared

Atchison, Topeka & Santa Fe.—Preferred, \$2.50, semi-annually, payable February 2 to holders of record December 31.

Chicago, Burlington & Quincy.—\$5.00, semi-annually, payable December 26 to holders of record December 15.

Colorado & Southern.—Common, \$3.00, annually, payable December 31 to holders of record December 15; Second Preferred, \$4.00, annually, payable December 31 to holders of record December 15; First Preferred, \$2.00, semi-annually, payable December 31 to holders of record December 15.

Erie.—First and Second Preferred, \$2.00, payable December 31 to holders of record December 13.

Lehigh Valley.—Common, \$.87½, quarterly, payable January 2 to holders of record December 13; Preferred, \$1.25, quarterly, payable January 2 to holders of record December 13.

Little Schuylkill Nav. R. R. & Coal.—\$1.13, payable January 13 to holders of record from December 13 to January 15.

New York, Lackawanna & Western.—1¼ per cent, quarterly, payable January 2 to holders of record December 15.

Northern Pacific.—\$1.25, quarterly, payable February 2 to holders of record December 31.

Pittsburgh, Ft. Wayne & Chicago.—Common, 1¼ per cent, quarterly, payable January 2 to holders of record December 10; Preferred, 1¼ per cent, quarterly, payable January 6 to holders of record December 10.

Old Colony.—\$1.75, quarterly, payable December 13 to holders of record January 2.

St. Louis, Rocky Mountain & Pacific.—Common, \$.25, payable December 31 to holders of record December 15; Preferred, \$1.25, quarterly, payable December 31 to holders of record December 15.

Railway Officers

Executive

E. S. Taylor has been appointed assistant to the vice-president and general manager of the Pullman Company, with headquarters at Chicago.

W. A. Peavy, chief engineer of the Sabine & Neches Valley, has been appointed assistant to the president, with headquarters as before at Shreveport, La.

Financial, Legal and Accounting

Thomas Kearns has been appointed auditor of freight and passenger accounts of the Western Pacific, in charge of freight overcharge claims as well as matters pertaining to freight and passenger accounting, and with headquarters at San Francisco, Cal. Mr. Kearns succeeds **C. N. Hotchkiss**, deceased.

Operating

J. K. Tully has been appointed superintendent of the Pullman Company, with headquarters at Chicago.

W. J. Jenkins has been appointed superintendent of telegraph of the Wheeling & Lake Erie, with headquarters at Brewster, Ohio.

E. W. Lollis, general superintendent of the Southern district of the Chicago, Milwaukee, St. Paul & Pacific, has been appointed manager of the fuel department, with headquarters as before at Chicago.

S. R. Kramer, who has returned from a leave of absence, has been appointed special assistant on the staff of the general superintendent of the Rutland. **U. V. Mace**, acting superintendent, has been appointed superintendent of the Vermont division of that road. Both will have headquarters at Rutland, Vt.

H. C. Taylor, superintendent of transportation of the Eastern lines of the Canadian Pacific, with headquarters at Montreal, Que., has been transferred to the Western lines, with headquarters at Winnipeg, Man., succeeding **J. G. Sutherland**, deceased. **Thomas Hope**, assistant superintendent of the Moose Jaw division at Moose Jaw, Sask., has been transferred to the Saskatoon division at Saskatoon, Sask. **J. W. Wilks** has been appointed assistant superintendent of the Moose Jaw division at Moose Jaw, succeeding Mr. Hope.

R. L. Hardgrave, trainmaster of the Southern Kansas division and the Wagoner district of the Central division

of the Missouri Pacific at Coffeyville, Kan., has been transferred to the Van Buren, Altus, Clarksville, Coal Hill, Paris and Fort Smith districts of that division at Van Buren, Ark., succeeding **E. E. Buckminster**, deceased. **F. L. Hays** has been appointed trainmaster at Coffeyville to replace Mr. Hardgrave. The jurisdiction of **G. R. Mabie**, trainmaster, has been extended to include all districts of the Southern Kansas division at Coffeyville.

Walter H. Edwards, who has been appointed general superintendent of the Lehigh & New England, as announced in *Railway Age* of November 29, page 1205, was born on January 29, 1890, at Wilmington, Del. Mr. Edwards completed his preparatory education at Bucknell Academy in 1908 and was graduated from Bucknell University with the degree of B. S. in Civil Engineering in 1913. He also attended the Harvard University summer school. He began his railroad career in August, 1909, in the construction department of the Baltimore & Ohio, which position he held until September, 1910, when he temporarily left that railroad to complete his engineering education. He returned to the B. & O. in September, 1913, as assistant on the engineering corps. In March, 1915, he undertook the duties of draftsman in the architect's office at Baltimore, Md. From June, 1915, until May, 1916, he was employed in the Bureau of Valuation of the Interstate Commerce Commission in connection with the federal valuation of railroads, being assigned to roadway field inventory duties. In May, 1916, he returned to the B. & O. as office draftsman in its valuation department, and in March, 1916, he was appointed cost engineer, which position he held until he left the service of the B. & O. on December 1, to accept the appointment as general superintendent of the Lehigh & New England.

Traffic

S. W. Hansen, assistant traffic manager of the Waterloo, Cedar Falls & Northern, has been promoted to traffic manager with headquarters as before at Waterloo, Iowa.

T. J. Pewters, general agent for the Minneapolis & St. Louis, at Minnesota Transfer, Minn., has been transferred to St. Paul, Minn. **H. C. Yutzy**, traveling agent at Minneapolis has been promoted to assistant general agent at St. Paul.

M. H. Jacobs, general freight agent of the Western Maryland, has been appointed freight traffic manager, solicitation, with headquarters at Pittsburgh, Pa., as before, and **C. C. Gray**, assistant general freight agent, has been appointed

to succeed Mr. Jacobs as general freight agent, solicitation, at Pittsburgh. **E. L. McCauley**, general freight agent, has been promoted to freight traffic manager at Pittsburgh, Pa. **T. H. Fee**, assistant general freight agent has been appointed assistant freight traffic manager at Baltimore, Md., and **W. S. Burton**, general foreign freight agent, has been appointed foreign freight traffic manager at Baltimore. **J. A. Inglis**, chief clerk of the eastern freight traffic committee, U. S. Railroad Administration, at New York, has entered the service of the Western Maryland as foreign freight agent at Baltimore.

Edward R. Bardgett, who was recently appointed general traffic manager of the Western Maryland, as announced in *Railway Age* of November 29, page



Edward R. Bardgett

1206, was born and educated in Buffalo, N. Y., and first entered the employ of the Northern Steamship Company in that city as a clerk. After two years he accepted a similar position with the Lehigh Valley, and then served successively as traveling freight agent, agent, westbound agent and general agent for the Lehigh Valley at Indianapolis, Ind., Milwaukee, Wis., Minneapolis, Minn., Chicago, St. Louis, Mo., and Cleveland, Ohio. During the war he served as port agent for the Ore & Coal Exchange at Toledo, Ohio. In 1919, he became connected with the Cunard Line as manager of the freight department at Cleveland, and later was transferred to New York as general freight agent, which position he held until he accepted the position as general traffic manager of the Western Maryland.

Engineering, Maintenance of Way and Signaling

A. A. Mathews, chief engineer of the Denver & Salt Lake, with headquarters at Denver, Colo., has resigned.

H. H. Smith, assistant division engineer of the Nebraska division of the

Union Pacific has been appointed office engineer of that division, with headquarters as before at Omaha, Neb., and the position of assistant division engineer of the Nebraska division has been abolished. **James Moran**, who has acted as general track foreman on construction of the new Omaha Union station, resumed his duties as general roadmaster of the Central division at Marysville, Kan., on December 1.

Ray E. Butler, who has been promoted to chief engineer of the Newburg & South Shore, with headquarters at Cleveland, Ohio, has been connected with that railroad for nearly 15 years. He was born at Brecksville, Ohio, on April 1, 1890, and graduated from Western Reserve University in 1913, receiving



Ray E. Butler

technical degrees from Case School of Applied Science in 1914 and 1920. Mr. Butler entered railway service in February, 1916, as construction engineer of the Newburg & South Shore at Cleveland. Two years later he was advanced to assistant engineer maintenance of way. In June, 1925, he was promoted to engineer, maintenance of way, a position he held until his further promotion to chief engineer.

Chester T. Dike, engineer of maintenance of the Chicago & North Western, has been promoted to chief engineer, with headquarters as before at Chicago, succeeding **Walter J. Towne**, deceased. **James A. Peabody**, signal engineer, with headquarters at Chicago, has been promoted to engineer of maintenance, succeeding Mr. Dike.

Mr. Dike has been engaged in railway service for more than 35 years, 32 of which have been with the North Western. He was born at Woodstock, Ill., on August 13, 1871, and graduated from Cornell College in 1893. Subsequently he completed a post-graduate course in civil engineering. Mr. Dike entered railroad service in 1890 as a chainman on the Northern Pacific. His continuous railroad service began in 1896 when he became chief engineer of the Mason City & Clear Lake at Mason City, Iowa. In 1898 he was appointed chief engineer of

the Iowa, Minnesota & North Western (now part of the C. & N. W.), and a year later he was appointed resident engineer of the North Western in charge of the location and construction of the I., M. & N. During 1901 and 1902 he served as resident engineer in charge of location and construction of the Peoria & North Western and the Verdigris ex-



Chester T. Dike

tension of the Chicago & North Western, while from 1903 to 1907 he was resident engineer and division engineer in charge of the location and construction of various branch lines of the latter road. He was then appointed superintendent of



James A. Peabody

the Pierre, Rapid City & North Western (now part of the C. & N. W.), and from 1909 to 1911 he served as engineer and superintendent of construction of the Belle Fourche Valley, the James River Valley and other new line projects of the North Western. In the latter year he was promoted to general superintendent of the Minnesota and Dakota divisions, with headquarters at Huron, S. D., and during federal control of the railroads he was successively assistant general superintendent at Boone, Iowa, and assistant general manager at Omaha, Neb. Upon the termination of federal control in 1920 Mr. Dike was appointed engineer of maintenance,

a position he held until his promotion to chief engineer on November 28.

Mr. Peabody, who has been promoted to engineer of maintenance, has been connected with the North Western for 32 years. This promotion terminates a service of 28 years as signal engineer for the road. He was born at Chicago on February 5, 1870, and entered railway service in 1888 as a rodman and instrumentman on the Baltimore & Ohio at Zanesville, Ohio. Four years later he was transferred to Pittsburgh, Pa., as an instrumentman and in 1894 he became chief draftsman of the Paige Iron Works at Chicago. Mr. Peabody entered the service of the North Western in 1898 as roadmaster at Tracy, Minn., later being transferred to Ashland, Wis., and to Milwaukee, Wis. He was promoted to signal engineer, with headquarters at Chicago, in 1902, his further promotion to engineer of maintenance becoming effective on December 1. He served as president of the Railway Signal Association (now the Signal Section, American Railway Association) in 1907.

Robert A. Sheets, who has been promoted to signal engineer of the Chicago & North Western, with headquarters at Chicago, has been connected with the signal department of that railroad for more than 23 years. He was born on September 5, 1885, and attended the Chicago Engineering Institute. Previous to entering railway service as a leverman on the North Western in January, 1907, Mr. Sheets was a stationary fireman. In June, 1907, he was transferred to the signal department as a batteryman on the Galena division at Maywood, Ill., then serving successively as a maintainer at West Chicago, Ill., signal foreman at Sterling, Ill., signal inspector in the signal engineer's office at Chicago and signal supervisor on the Chicago terminal and at Boone, Iowa. Mr.



Robert A. Sheets

Sheets was promoted to assistant engineer, train control, in charge of field construction in January, 1925, then being further promoted to assistant signal engineer in December, 1927. His pro-

motion to signal engineer became effective on December 3.

Mechanical

W. R. Wood, mechanical engineer of the Great Northern, has been promoted to assistant general superintendent of motive power, with headquarters as before at St. Paul, Minn.

Karl Berg, who was appointed superintendent of motive power of the Pittsburgh & Lake Erie and Lake Erie & Eastern, as announced in *Railway Age* of November 8, page 1014, was born in Sweden in December, 1881. He was educated in the public schools of Sweden and attended the New York Central apprentice school while serving as an apprentice. After completing the apprentice course, he continued until 1913, studying mechanical engineering in the evening classes of the School of Applied Science, Carnegie Institute of Technology, at Pittsburgh, Pa. He entered the service of the Pittsburgh & Lake Erie at the McKees Rocks shops as a machinist helper in May, 1903, and be-



Karl Berg

came machinist apprentice in May, 1904. He completed his apprenticeship in May, 1908, and at that time was appointed mechanical draftsman in the mechanical engineer's office at Pittsburgh. In November, 1909, Mr. Berg accepted a position with the H. K. Porter Locomotive Company at Pittsburgh as a locomotive designer, which position he held until July, 1911, when he returned to the service of the Pittsburgh & Lake Erie, serving for a time in the mechanical engineer's office. He was later advanced to chief draftsman, and in June, 1917, became mechanical engineer. In September, 1920, he was appointed shop superintendent at the McKees Rocks shops, and in September, 1927, he became assistant superintendent of motive power, the position he held until his recent promotion.

Obituary

W. I. Jones, coal traffic manager of the Missouri Pacific, with headquarters at St. Louis, Mo., died in that city on December 4.

J. R. Hackett, vice-president and traffic manager of the Georgia Northern, died at his home in Moultrie, Ga., on December 8, following a long illness. He was 54 years of age.

Peter Howatt, division storekeeper on the Atchison, Topeka & Santa Fe at Corwith, Ill., for the past 25 years, died recently from injuries received in an automobile accident.

George H. Bower, former general passenger agent of the Illinois Central at Memphis, Tenn., died at his home at Miami, Fla., on December 4. Mr. Bower, who was 66 years of age and a native of Ohio, had been successively in the traffic departments of the New York Central, the Missouri Pacific, the Yazoo & Mississippi Valley and the Illinois Central for 38 years. He was general passenger agent for the Illinois Central at Memphis from 1911 until his retirement in 1920. Since that time he had been engaged in real estate development in Florida.

Walter T. Krausch, engineer of buildings of the Chicago, Burlington & Quincy, with headquarters at Chicago, died at his home at La Grange, Ill., on December 9, after an illness of several months. Mr. Krausch was born at Philadelphia, Pa., on June 11, 1869, and obtained his academic training at the Evanston (Ill.) high school, at a technical school at Buffalo, N. Y., and under private tutoring. From 1888 to 1890, he was associated with his father in Theodore Krausch & Co., architects and engineers at Buffalo, in the design and construction



Walter T. Krausch

of coal storage, refrigerating and power plants. He entered railway service in February of the latter year in the engineering department of the Burlington at Chicago, and was appointed architect. In December, 1905, he became associated with the engineering and mechanical department of Fairbanks-Morse, and returned to railway work in 1912 as engineer of buildings of the Burlington, a position he held continuously until his death.

Charles Ware, former general manager of the Union Pacific, who retired from that position in 1916, after 34 years

of railway service, died at Tulsa, Okla., on December 2. He was born at Jonesboro, Ill., on January 31, 1863, and attended the Southern Illinois Normal University at Carbondale. In 1882 he obtained his first railroad experience as a telegraph operator on the Chicago & North Western. Later he served with that road as a dispatcher and chief dispatcher. In 1890 he became a dispatcher on the Union Pacific, then being promoted to chief dispatcher and assistant superintendent. He was advanced to superintendent of the Nebraska division at Omaha, Neb., in 1905, and five years later, in March, 1910, he was promoted to general superintendent at the same point. After two months as general superintendent Mr. Ware was further promoted to assistant general manager, becoming general manager in 1912.

Walter James Towne, chief engineer of the Chicago & North Western with headquarters at Chicago, who died at his home in Oak Park, Ill., on November 23, from pneumonia, had been engaged as a railway engineer and operating officer for 36 years. He was born at Leavenworth, Kan., on November 28,



Walter James Towne

1867, and entered railway service in 1886 as a rodman on the Atchison, Topeka & Santa Fe. After spending the four years from 1891 to 1895 at Rensselaer Polytechnic Institute, Mr. Towne was an assistant engineer on the New York State Canals from 1896 to 1899, then returning to railway service as an assistant engineer on construction on the North Western at Boone, Iowa. He was transferred successively to Kaukauna, Wis., and Escanaba, Mich., and from 1902 to 1906 he served as division engineer at Baraboo, Wis., at Escanaba, and at Chicago. He was then appointed engineer of permanent improvements and late in 1906 was promoted to engineer of maintenance of way, with headquarters at Chicago. After six years in that position Mr. Towne entered the operating department as general superintendent in 1912, then being promoted to assistant general manager at Chicago in 1914. In March, 1920, he was appointed engineer of maintenance of way, his promotion to chief engineer becoming effective in June of the same year.